

79 00698



CIRCULATION ELEMENT OF THE SAN BRUNO
GENERAL PLAN

Prepared for the San Bruno Planning Dept.

August 29, 1975

Torrey & Torrey Inc.

Planning
Urban Design
Community Participation

1932 Polk Street
San Francisco Ca 94109

[Torrey & Torrey, Inc.]

San Bruno -- City planning

City planning -- California

Traffic engineering -- " -- San Bruno

INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

SEP 1 1978

UNIVERSITY OF CALIFORNIA

Torrey & Torrey Inc.

Planning
Urban Design
Community Participation

1932 Polk Street
San Francisco Ca 94109
415 771 7722

79 00678

August 29, 1975

Mr. Paul Moeller, Director
Planning Dept.
City Hall
567 El Camino Real
San Bruno, Ca. 94066

Dear Paul:

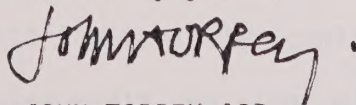
We are pleased to submit to you the enclosed Circulation Element for San Bruno which complies with the requirements of the State Council of Intergovernmental Relations guidelines for General Plan elements and State Environmental Impact Report Guidelines.

The principal focus of the Circulation Element is on traffic management--ways to better use the existing street rights-of-way in San Bruno for purposes for which they are intended and recommended action programs for remedial improvement of streets and intersections in San Bruno.

Coordination of San Bruno circulation goals, objectives, and action programs with San Mateo County, the California Department of Transportation, the Metropolitan Transportation Commission, and current local and inter-city transit operators in and near San Bruno will remain an important task for the City inasmuch as the great majority of auto and transit trips in San Bruno are through trips, unrelated to and potentially contradictory to San Bruno circulation objectives.

We are confident that we have provided the residents of San Bruno with a workable Circulation Element. It is through the continuing efforts of the Planning Commission, the Mayor, the City Council, and City staff that the policies outlined in the Element will become a reality.

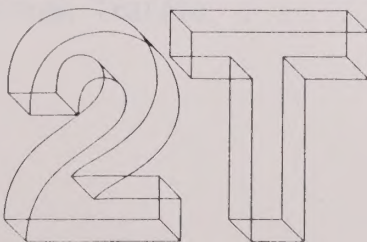
Sincerely yours,



JOHN TORREY AIP
Vice-President

JT:jr
Enc.

Irene Perlis Torrey AIP
John Torrey AIP



79 00698


INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

SEP 30 2024

UNIVERSITY OF CALIFORNIA

TABLE OF CONTENTS

	<u>Page</u>
I. Introduction and Summary	1
II. Goals, Objectives and Policies	2
III. Circulation Background and Problems	7
A. The Physical Context	7
B. Travel Characteristics	7
C. Characteristics of the Circulation System	7
Freeway Network	9
Arterial Network	9
Collector Streets	10
Parking	12
Mass Transportation	12
D. Summary of Circulation Needs in San Bruno	12
IV. Evaluation of and Recommendations for Action Programs for Circulation.	13
1. Action Programs to Improve Problem Intersections in San Bruno	15
2. Action Programs to Ensure Driver and Pedestrian Safety . . .	15
a. Speeding in neighborhoods	16
b. Parking in residential neighborhoods	16
c. Pedestrian-vehicular conflicts	16
d. Turning radii and sight distances	17
3. Action Programs to Encourage Greater Use of Public Transportation	17
4. Action Programs to Mitigate Work Trip Travel	18
5. Action Programs to Ensure Proper Separation of local and through Traffic	19



Digitized by the Internet Archive
in 2025 with funding from
State of California and California State Library

<https://archive.org/details/C123310644>

	<u>Page</u>
6. Action Programs to Ensure Protection of Neighborhoods from Adverse Circulation Impacts	20
a. Roadways	20
b. Railroads	21
7. Action Programs to Ensure Continued Street Maintenance and Beautification	21
8. Action Program to Ensure Proper Coordination of Development Planning with Traffic Capacities	23
9. Action Programs to Ensure Local Coordination with Area and Regional Transportation Planning and Operating Agencies	23
V. Implementation/Continuing Evaluation and Planning Process . . .	24
A. Federal and State Financing Mechanisms	24
B. Other Funding Sources for Transportation Improvements . . .	24
VI. Environmental Impact	25
A. Description of Project	27
B. Description of Environmental Setting	27
C. Environmental Impact	27
D. Any Adverse Environmental Effects Which Cannot be Avoided if the Proposal is Implemented	27
E. Mitigation Measures Proposed to Minimize the Impact	28
F. Alternatives to the Proposed Action	28
G. The Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity	28
H. Any Irreversible Environmental Changes Which Would be Involved in the Proposal Should it be Implemented	28
I. The Growth Inducing Impact of the Proposed Action	28
VII. Bibliography	29

LIST OF TABLES

Following Page

Table 1.	Where Do San Bruno Residents Work and How Do They Get To Work (by census tract)?	28
Table 2.	Where Do San Bruno Residents Work?	
Table 3.	How Do San Bruno Residents Get to Work?	
Table 4.	Where Do San Mateo County Residents Work and How Do They Get to Work?	
Table 5.	How Many Cars Do San Bruno Residents Own?	
Table 6.	What Kind of Trips Do Bay Area Residents Take and How Do They Travel?	
Table 7.	How Many People Travel in the Bay Area in Cars for Weekday Trips (by Trip purpose)?	
Table 8.	When Do Bay Area Residents Travel (By time of day - importance of peak-hour or house-to-work travel)?	

LIST OF EXHIBITS

A.	1974-75 Average Daily Vehicle Trips/Projected Trips
B.	San Bruno Select Street System
C.	Circulation Problems/Planned Improvements
APPENDIX A.	Relation of Transportation Planning to Air Pollution Reduction Programs
APPENDIX B.	Traffic Control Devices

I. Introduction and Summary

The Circulation Element of the General Plan for San Bruno responds to the requirements of the State Council on Intergovernmental Relations and Environmental Impact Reports guidelines. Review and comments by the staff of the Planning and Public Works Departments and the Planning Commission have been incorporated into the Element and public review at a public hearing is anticipated before completion of the final Circulation Element in San Bruno.

The policies put forth in the Circulation Element are structured to: establishing a comprehensive transportation system; providing efficient, safe, and pleasant movement in San Bruno; mitigating negative environmental impacts of vehicles; developing an adequate local transit system; and providing transportation services for all San Bruno residents.

Essentially, the policies and action programs deal with traffic management and no major new facilities are recommended in the Circulation Element. Short, mid, and long range action programs are recommended to serve existing and likely future circulation and circulation-related needs of San Bruno residents. The action programs deal with: improving problem intersections, ensuring driver and pedestrian safety, public transportation, mitigating the effects of work trip travel, separating local and through traffic, protecting neighborhoods from traffic impacts, continued street maintenance and beautification, coordinating development planning with traffic capacities, and transportation planning coordination with regional agencies.

Periodic review of the effectiveness of circulation improvements as well as more detailed study of the circulation improvements before implementation are necessary task areas for City staff to undertake. Through the efforts of City staff, the Planning Commission, Mayor, and City Council progress can be made toward implementing and carrying out necessary circulation policies and action programs for the City of San Bruno.

II. Goals, Objectives, and Policies*

Because local travel in San Bruno is for the most part easily accommodated by existing streets and arterials and there is adequate separation of local traffic from the considerable amount of traffic that goes through San Bruno, the general focus of the San Bruno Circulation Element is on improving the existing transportation network.

Five areas of interrelated yet distinct circulation goals, objectives, and policies are set forth in the Circulation Element to deal with circulation problems and potentials in the City. These are:

- ESTABLISHING A COMPREHENSIVE TRANSPORTATION SYSTEM
- PROVIDING EFFICIENT, SAFE, AND PLEASANT MOVEMENT IN SAN BRUNO
- MITIGATING NEGATIVE ENVIRONMENTAL IMPACTS OF VEHICLES
- DEVELOPING AN ADEQUATE LOCAL TRANSIT SYSTEM
- PROVIDING TRANSPORTATION SERVICES FOR ALL SAN BRUNO RESIDENTS

Goal 1: To develop a comprehensive transportation system in San Bruno. Such a system would consist of a combination of auto movement routes and traffic control devices, transit routes and services, adequate transportation connections to regional transit systems, and pedestrian paths and bike routes.

Objectives:

- To use the transportation system to reinforce the economic vitality of existing commercial activities and community facilities in San Bruno.
- To use the transportation system to reinforce other San Bruno goals, regarding land use, population, employment, and neighborhood preservation and development.
- To ensure that the transportation system is not detrimental for the environmental resources and social values of the City.
- To design the system to encourage reduction in the over-dependence on the automobile as a transportation mode.
- To design the transportation system to conserve energy resources insofar as this objective is consistent with the provision of necessary and adequate transportation services.

Policies: Conservation of existing facilities

- Place a high priority on projects which are designed to improve the safety of existing facilities.
- Place a high priority on improving the efficiency of existing facilities before building new ones.

*The goals, objectives, and policies for circulation in San Bruno are based on a thorough review of local circulation problems and potentials in the City, discussion with City staff and area and regional transportation planning agencies, and review of pertinent, local, county, and regional circulation plans and programs.

Safety

- Consider general public safety and seismic safety in the planning, location, and construction of new transportation facilities, or improvements to existing facilities.

Comprehensiveness

- Design the transportation system to serve the needs of San Bruno residents and visitors alike, within the City, and between the City and other parts of the region.

Compatibility

- Employ transportation system design to guide the type and amount of new land development and to improve the environment.
- Design the transportation system routes to be consistent with adjacent land uses.

Goal 2: To provide for efficient, safe, and pleasant movement on San Bruno arterials and local streets.

- Objectives:
- To provide adequate conditions for vehicular traffic flow movement, consistent with need.
 - To cooperate with the state and county to provide views and vistas from all scenic roads and highways and to improve visual appearance of El Camino Real, San Bruno Avenue, and Sneath Lane as major focal elements in the City.
 - To improve the safety of vehicular, pedestrian, and bicycle movement in San Bruno.
 - To improve circulation in residential, commercial, and industrial areas in San Bruno.
 - To reduce unnecessary through traffic and speeding in neighborhoods.
 - Encourage off-street residential parking.

Policies: New development

- Consider availability of street capacities as a prerequisite for approval of new housing and commercial developments.

Traffic safety

- Undertake specific improvements in residential and commercial intersections with high accident rates and congestion levels.

Traffic management

- Undertake a traffic management program throughout San Bruno to separate through traffic from local neighborhood traffic, to increase roadway safety, and to reduce unnecessary speeding in local neighborhoods.

Goal 3: To protect the City's residential, recreational, and open space areas from the negative environmental impacts of vehicles on major freeways, arterials, and local streets.

Objectives:

- To keep unnecessary non-residential traffic out of San Bruno's neighborhoods.
- To protect the residents of existing and new housing developments from excessive noise and air pollution, vehicular congestion, and traffic accidents.
- To protect residential and open space areas from adjoining non-residential land uses which have negative circulation-related environmental impacts.

Policies: Negative environmental impacts

- Coordinate local transportation programs with regulatory agencies to achieve tolerable noise and air quality standards.
- Avoid the encroachment of transportation facilities on irreplaceable resources, such as important open spaces, recreational areas, and historic sites, unless there are no other feasible alternatives which comply with other San Bruno policies.
- Design transportation programs so as to minimize social and economic disruptions to residential and commercial neighborhoods.
- Develop a set of remedial mitigation measures to deal with the critical negative environmental impacts of highways in San Bruno.
- Ensure that any proposed new housing would be free from objectionable noise from adjoining major streets.

Incompatible uses

- Ensure that when negative impacts of highways on their surroundings cannot be avoided, that appropriate mitigating measures are employed in highway right-of-way design and landscaping to protect valuable local resources (documented in the Noise Element).

Goal 4: To develop an adequate locally oriented transit system with good connections to adjacent local and regional transit systems, to provide a competitive alternative to automobile usage.

Objectives:

- To encourage the implementation of San Mateo County's proposed bus system, improvement of the Southern Pacific rail system, and other regional transit systems, as preferred alternatives to automobile design.
- To develop intra-city transit service in San Bruno, serving the principal commercial, industrial, and residential areas and providing feeder service to inter-city public transportation systems (Southern Pacific and Greyhound).

- To establish pedestrian and bicycle routes as alternative modes of access to major activity centers wherever possible.
- San Bruno's transit system should be coordinated with local systems of nearby cities in the County.
- Study the possibility of coordinating the San Bruno Transit System with the school district bus systems.

Policies: Coordination with regional systems

- Urge the Southern Pacific Railroad and pertinent regulatory and transportation planning agencies to upgrade and maintain the rail station and service in San Bruno in order to provide a safe, convenient, and attractive place for local transfer to inter-city rail service.
- Should BART be implemented in San Mateo County, ensure that route and station location, design of facilities, and off-site improvements (i.e., local streets) meet with local approval.
- Coordinate with Southern Pacific Railway to:
 - minimize conflicts between vehicular traffic and rail usage
 - enhance the visual relationship between rail lines and adjoining land uses
 - provide convenient parking facilities, bus links, road connections, and bicycle and pedestrian paths to the Southern Pacific station and provide proper bus stop facilities for the eventual County bus system and proper transit connections to the San Francisco Airport and Airport employment centers.

Efficiency of local service

- Locate public transit routes in San Bruno so that a majority of residents would be within walking distance of transit stops.

Community participation

- Seek community input in the placement of transit routes, timing of schedules and general operations.

System flexibility

- Plan the local system with built-in flexibility for increases in service in accordance with increases in demand; coordinate with local school districts on possible joint transit usage.

System design and operation

- Design the local system for maximum passenger satisfaction: safety, comfort, convenience, and privacy.

Goal 5: To provide transportation services for all San Bruno residents, for access to jobs, shopping, social services, and recreational activities.

Objectives:

- To influence regional transit systems and to design the local system to serve the transportation-dependent groups, including lower income families which do not own an automobile, the elderly, the young, the handicapped, and otherwise transportation-dependent groups.
- To provide maximum transit service (local, County, and regional) to shopping centers, hospitals, schools and colleges, and other public service centers.
- To provide maximum transit service to existing and potential employment centers from the areas with high concentrations of poverty level population.

Policies: Location of regional, County, and local transit routes

- Influence the location of regional and County and local transit routes for convenient access to jobs, shopping, and social services.

Reduced transit fares

- Investigate the potential for reduced fare transit in San Bruno's local system as a means of increasing transit patronage and lowering the cost of transportation for disadvantaged groups.

III. Circulation Background and Problems

A. The Physical Context

The West Bay Corridor extends from San Francisco in the north to San Jose in the south and includes the narrow band of intensively developed urban areas on the West Bay Peninsula. Two major freeways, Routes 101 and 280, and bus and train commuter service (Greyhound and Southern Pacific, respectively) traverse the length of the corridor. San Francisco International Airport, proximate to San Bruno east of 101 and accounting for a significant number of commute work trips from San Bruno, is located along the edge of the Bay.

San Francisco is a major focal point for automobiles and transit lines connecting this regional center with other parts of the Bay Area, including San Bruno. Local transit coverage and service is spotty in San Mateo County and will not improve until San Mateo cities and the County initiate local and coordinated bus transit services. To date the cities of San Bruno, South San Francisco, Pacifica and Daly City are planning local coordinated bus systems in the near future which will eventually be merged into a county-wide bus operation. Dependency on the automobile remains high, even in the relatively dense areas of the northern part of the County. The adequacy of the present transportation system, heavily dependent on automobile usage, to carry travel (particularly heavy commute movement) remains one of the most significant transport problems of the County and San Bruno.

In addition to the traffic congestion problems that this dependency on the auto system causes, is the equally important area of physical and social impacts on communities and neighborhoods. San Bruno has been bisected into several relatively isolated neighborhoods by a succession of north-south oriented highway and major thoroughfare developments - U.S. Route 101 on the east; El Camino Real (State Route 82); Route 280; and Skyline Blvd. (State Route 35) on the west. (See Exhibit C, Circulation Problems/Planned Improvements.) An additional route, 380, will connect Routes 280 and 101 in the near future. Because the traffic on these routes is often heavy, especially during the morning and late afternoon peak hours, City residents are also susceptible to air and noise pollution impacts from these same corridors.

B. Travel Characteristics

The population of San Bruno increased by 24.7% from 1960 to 1970 (1970 population was 36,254) and the total number of automobile trips in and near San Bruno has increased also, reflecting increased population and employment growth in San Mateo County and the Bay Region as well as the number of cars owned per family, declining occupancy rates per vehicle, and the number of vehicle trips made per household.* Almost all of the west bay trips are made in private autos since public transit availability is limited in San

*Bay Area Transportation Study Commission, Bay Area Transportation Report, Berkeley, 1969.

Mateo County. In short, San Bruno has kept pace with the County in terms of traveler behavior, population growth, and, to a limited extent, employment growth.

Most trips in San Bruno are through trips, simply passing through the City on Routes 101 and 280 (see Exhibit A, 1974-75 Average Daily Trips/Projected Trips). Of the current (1974-75) average daily vehicle trips that occur in and near San Bruno on Route 280 (approximately 60,000) and Route 101 (approximately 135,000) a majority are through trips. The current number of daily auto trips within, into and out of San Bruno (that is, autos actually using the City's local streets and arterials) is about 100,000. This figure is based on an average of approximately 8 vehicle trips per day generated by households in San Bruno and 2 vehicle trips per day for the employees working in the City.

Although no accurate estimate is currently available on the purpose of local trips, it can be assumed by a comparison of worker destinations (see Table 2) that San Bruno is essentially an outcommuting City. Thus, about half of the City's workers (8307) work in San Mateo County (and a smaller number of these within San Bruno) as compared to the current number of jobs available (approximately 4000)* in San Bruno to residents and non-residents.

Since an inspection of Tables 3 and 5 indicates a relatively low number of auto passengers on work trips and a high proportion of households with more than one car in San Bruno, it can be concluded that most trips, especially the work trip, are made with few passengers. Moreover, because almost all of the work trip travel occurs in a narrow band of time comprised of two hours, morning and evening, work trip travel is highly concentrated in the day, as compared to most other, non-work trips which are more evenly spread throughout the day. Table 8 depicts the typical daily peak hour pattern in the Bay Area.

Table 3 illustrates that transit ridership (on Greyhound and Southern Pacific) for work trips is slightly more than 6 percent of the total work person trips; walking accounts for another 3 percent and the automobile dominates with 87 percent of all work trips. The City has a relatively low concentration of employment (4000) when compared with its current (1974) population of 38,600. The net result of this is that San Bruno exports a large number of workers to areas outside the City. While more than half of San Bruno's labor force remained in San Mateo County in 1970 (see Table 2), 9 percent traveled to downtown San Francisco on an average workday in 1970 and 26 percent were destined for other parts of San Francisco. The remainder traveled to other parts of Alameda County, to Contra Costa and Marin Counties, and 3 percent to areas outside the nine county Bay Area.

Assuming that half of the people who work in the City come from outside San Bruno, approximately 4000 (2 vehicle trips times 2000 jobs)

*Estimate derived from figures given by the San Bruno Planning and Public Works Departments and estimates by Torrey & Torrey, Inc.

non-resident average daily vehicle trips arrive at and depart from job locations located for the most part in the eastern part of the City--downtown, Bayhill, Tanforan area and east of the railroad tracks. By and large these trips are made on San Bruno Ave. via 101, San Bruno via 280, and El Camino. Resident workers leaving the City use, for the most part, these same routes and related intersections thus complicating peak hour congestion problems at some locations in the City. Exhibits A and C confirm these conclusions on current work trip travel patterns. As an example, the intersection of San Bruno Ave. and El Camino Real is a very busy intersection because approximately 70,000 vehicles use the intersection (about 7,000 in the peak hour) daily, making turning movements and traffic flow difficult in peak periods.

Regarding future travel projections, available land for commercial development would indicate that route and intersection traffic volumes would increase on major arterials and intersections that are already experiencing some peak hour congestion, especially the San Bruno Ave./El Camino Real intersection. Even though the completion of the Route 380 project would cause a considerable number of drivers to use 380 instead of San Bruno for east-west travel (see estimated reduced travel on lower San Bruno Ave. in 1990 - Exhibit A) over time Bayhill development and normal traffic flow increases on San Bruno (as a result of local use of San Bruno Ave. as a major arterial) and El Camino would require improvements for turning movements at this intersection.

Approximately 11% (see Table 3) of San Bruno workers ride as passengers on work trips which means that almost 90% of all workers traveling to work in and outside the City travel alone. This fact is further magnified by the fact that all of this work travel is very peaked, and occurs principally in two 2-hour peak periods. It is significant that auto occupancies are a good deal lower (see Table 7) for work trips than for other kinds of trips, because low auto occupancy places a higher burden on streets and highways in rush hours than is necessary as the person-carrying capacity of the highway facilities is being under-utilized. Transit can best serve the house-work trip because it is usually a many-to-one kind of trip.

C. Characteristics of the Circulation System (see Exhibits A, B, and C)

An inventory of existing conditions and problems of the local transportation system in San Bruno is comprised of:

- the freeway network
- local arterial and street network
- locally available public transportation

Freeway Network

U.S. Route 101 - an 8 lane north-south freeway east of San Bruno. This freeway connects cities and employment centers along the Bayshore and is of major importance to drivers departing and entering San Bruno. 101 also provides direct access to the San Francisco International Airport via the airport interchange. 101 is currently operating at

near capacity conditions in the peak hour with approximately 135,000 average daily vehicle trips at the section nearest San Bruno.

Interstate 280 - an 8 lane north-south freeway running through San Bruno on its west side parallel to 101 and providing access for communities and activity centers west of 101. 280 acts as an alternate route for many north peninsula destinations. With 65,000 average daily vehicle trips on the San Bruno section, this freeway has a margin of excess capacity. 280 is a designated scenic highway.

Interstate 380 - scheduled for completion in 1975 (between El Camino Real and Route 101) this 6-10 lane freeway segment will connect Route 280 with Route 101 and will absorb a good portion of east-west traffic now using San Bruno Ave. 380 is a proposed scenic highway.

Whether Route 380 is extended from 280 to Pacifica is a question of feasibility and prudence. In light of revised lower population estimates used as a partial basis of travel demand projections, emerging transit priorities of the County and north peninsula communities, priority funding for other freeway projects, existence of alternatives (including modification to existing Sharp Park Road), and the severe land alteration and growth inducing impacts that such a freeway extension could cause, it appears unlikely that recommendations for a 4 lane freeway between 280 and Pacifica are supportable at this time. In September 1974, the San Bruno City Council adopted a position in opposition to extension of Route 380 west of Interstate 280.

Arterial Network

Skyline Blvd. (State Route 35) - a major 4 lane north-south roadway to a point 400 feet south of Sneath Lane where it becomes 2 lanes from thereon to the South City limits. The 2 lane portion will eventually have to be made 4 lanes because of predicted traffic flow increases. Skyline Blvd. is a potential scenic corridor.

El Camino Real (State Route 82) - a major 6 lane boulevard connecting San Bruno with South San Francisco on the north and Millbrae on the south and providing access to major nearby San Bruno activities. There are parallel parking lanes and sidewalks on either side of the street and there is a 16 foot median with left turn lanes at major intersections throughout the length of El Camino in San Bruno. El Camino currently carries about 35,000 vehicles per average weekday without problems except at some major intersections (El Camino and San Bruno, El Camino and San Felipe, and El Camino and Santa Lucia). El Camino Real is a proposed scenic corridor.

San Bruno Ave. - a 4 lane arterial roadway with a median trip and left turn lanes and 6 foot shoulders on either side between Route 280 and Elm Ave. There are sidewalks on the north side from Crestmoor Ave. to 7th Ave. and on the south side from Acacia to 7th Ave. San Bruno acts as a major arterial street (connecting eastern and western areas of the City and providing access to major activity centers along its route)

from Skyline Blvd. to Route 101 and is a major entrance/exit for San Bruno at 101 as well as a principal route for San Francisco Airport support activities east of 101.

San Bruno Ave. carries over 39,000 vehicles per average weekday and is congested in the peak period at its most eastern portion. Route 380 will help alleviate this problem. Left turns to El Camino are difficult. There are lane capacity problems westbound between Cherry and 280 and U turns are difficult at Elm Ave. San Bruno Ave. from Skyline to El Camino is a scenic corridor.

Sneath Lane - Sneath Lane links Skyline Blvd. and El Camino Real, and Route 280 and Huntington Ave. The upper portion (between 280 and Skyline) is a 2 lane roadway that connects and distributes traffic to nearby local streets. There are sidewalks in this segment from Rollingwood to Sequoia on the south side (under construction), on the north side from Sequoia to West Claremont (under construction), and on the south side from West Claremont to Skyline.

From Rollingwood Drive to Huntington, Sneath Lane is 4 lanes with a 16 foot median strip just east of 280 to Huntington. There are sidewalks from Rollingwood Drive to Huntington. Because the current 22 foot roadway between Rollingwood Drive and Skyline is narrow, has poor horizontal and vertical alignment and sight distances, and because there are pedestrian safety problems at Engvall Road, the City is undertaking the improvement of this segment to a 40 foot right-of-way with shoulders and sidewalks where appropriate.

There are intersection problems at Cherry Ave. and Commodore Drive because of traffic density, left turn problems at Rollingwood intersection, sight distance problems at Sequoia Ave., and left turn density and storage problems at 280 freeway ramps.

San Mateo Ave. - a major 2 lane shopping street serving the San Bruno Central Business District with parking on both sides and sidewalks that vary from 10-1/2 feet to 16 feet (there are sidewalk "bulbs" at the corners and centers of blocks). Plans for beautification of San Mateo Ave. have already been carried out and there are tree planters and assorted "street furniture" on San Mateo Ave. in the Central Business District.

Crystal Springs Road - a major 2 lane east-west arterial connecting the hilly areas of the City with the flat areas and providing principal access to City and County parks at the southern edge of San Bruno. There are sidewalks on both sides from El Camino to Cypress, sidewalks on the north side from Cypress to Donner, and sidewalks from Crestmoor Drive to the County Park entrance.

Sharp Park Road - a major 3 and 4 lane arterial connecting San Bruno with Pacifica on the west and connecting neighborhood collector streets and the San Mateo Jr. College with Skyline Blvd. and Westborough Blvd. heading east. There are 8 foot shoulders on both sides with no parking or sidewalks.

Jenevein Ave. - a 2 lane arterial street with parking and sidewalks on both sides. Jenevein connects hill area collector streets and local streets east of 280 with El Camino Real and San Mateo Ave.

Hill Area Collector Streets

Oakmont, Valleywood, Fleetwood, Sequoia, Crestwood, Rollingwood, Berkshire Drive, Earl Ave., Glenview Drive, Crestmoor Drive, Madison Ave., Piedmont Ave., Whitman Way, Roswood Drive, Alston Drive, Susan Drive, Allen Drive, Monterey Drive, and the upper portion of Sneath Lane are all hill area collector streets that connect local streets with the previously described arterial streets. For the most part these streets have a 40 foot pavement with parking and sidewalks on both sides and are able to handle existing and likely future increases in traffic volumes.

Flatland Area Collector Streets

Cherry Ave., Bayhill Drive, Kains Ave., Elm Ave., Linden Ave., Santa Lucia Ave., San Felipe Ave., Park Blvd., Santa Helena Ave., Santa Inez Ave., Mastick Ave., Sylvan Ave., West Ave., Forest Lane, the lower portion of Sneath Lane, Huntington Ave., Scott St., First Ave., and Seventh Ave. are flatland area collector streets that connect local streets with arterial streets. For the most part these streets have a 36 foot pavement with parking and sidewalks on both sides and are able to handle existing traffic volumes, except for some problems at key intersections. The need for improvements at key intersections will increase in the future as traffic volumes increase.

Parking

City owned off-street parking lots are seldom full, although some, such as the one on the 500 block of San Mateo Ave., fill up faster than others. There are no parking meters in the City and most parking areas are timed for 2 hour usage. Should demand for street parking increase in the future, reducing permissible parking from 2 hours to 1 hour (as on San Mateo Ave.) would be possible. In some cases commercial developments on San Bruno Ave. and El Camino Real do not have adequate on-site parking; and as changes to the existing uses occur, provisions for adequate parking should be ensured according to the Zoning Ordinance.

Public comment and concern of certain residents in San Bruno indicates that in some areas on-street parking in residential neighborhoods is a problem. On-street parking is excessive on Linden Ave., Shelter Creek Lane, Sylvan Ave., Huntington Ave., and other streets.

Mass Transportation

Greyhound Lines connect San Bruno with other Bayshore cities and San Francisco via a bus depot near San Bruno Ave. and El Camino Real. The Southern Pacific Railroad provides rail service with a station stop near Sylvan Ave. and Huntington Ave.

The City of San Bruno is planning to provide local transportation service with three general routings and five buses designed to serve as many local residents as possible, basically connecting residential areas with local activity centers. It is also planned to interconnect the San Bruno system with new local systems in Pacific and South San Francisco. The San Mateo County Local Bus Transit Study recommends the initiation of County-wide transit service and it is likely that local north peninsula transit systems, including San Bruno's, would merge with the County-wide operation which would provide a combination of local and County-wide service.

It is not certain at this time whether BART would be extended to the San Francisco Airport and/or to southern portions of San Mateo County. Whether the County-wide bus system and upgrading the Southern Pacific Railroad services would serve the Westbay in lieu of BART remains to be seen. Should BART eventually be extended from the Daly City Station, it is in San Bruno's best interests to coordinate a locally desired routing and station location with the Metropolitan Transportation Commission and BART.

D. Summary of Circulation Needs in San Bruno

The following are the basic categories of existing circulation needs and needs in the foreseeable future in San Bruno.

1. work trip travel - increasing the number of riders per vehicle for work trips into and out of the City.
2. public transportation - providing local public transportation services to interconnect with local area transit services and with work-trip oriented regional transit for all San Bruno residents, especially those with special transportation needs--the elderly, young, handicapped, and other transportation-dependent individuals and groups.
3. intersection improvements - to improve current and likely future traffic flows and safety problems at major intersections in the eastern part of the City.
4. development planning - to ensure that future land development can be accommodated by adjacent streets.
5. separation of local and through traffic - to maintain a local street system that will encourage traffic passing through San Bruno or between major areas of San Bruno to keep to roadways designed for that purpose.
6. traffic safety - to ensure that San Bruno streets are safe for drivers and pedestrians alike.
7. street maintenance and beautification - to ensure that San Bruno's streets are properly maintained and that opportunities for

enhancing the attractiveness and use of San Bruno's streets and arterials for pedestrians and bicyclists are incorporated into future planning.

8. neighborhood preservation - to ensure that neighborhood impacts from existing and future roadway improvements are mitigated to the greatest extent possible.
9. inter-agency coordination - to ensure that San Bruno's interests are well represented in future planning of regional and surrounding local transportation systems.

IV. Evaluation of and Recommendations for Action Programs for Circulation

1. Action Programs to Improve Problem Intersections in San Bruno (time frame - short range - 1-3 years, and mid-range - 5 years)

There are a number of major street intersections that are currently problem intersections and would likely cause circulation problems in the future.

The following problem intersections and proposed solutions need individual study of current and likely future (see Exhibit A) route and intersection traffic volumes and actual roadway conditions to ensure a proper solution in each case. The solutions indicated have been approved by the San Bruno Traffic Safety Committee.

<u>Intersection</u>	<u>Problem</u>	<u>Solution</u>
San Bruno Ave. @ El Camino Real	Left turn movements from San Bruno to El Camino	Installation of left turn signalization
San Felipe Ave. @ El Camino Real	Intersection traffic density	Signalization
San Bruno Ave. @ Elm Ave.	"U" turn in restricted street width area	Widen southeast corner area
Sneath Lane @ Cherry Ave.	Intersection traffic density	Signalization
Sneath Lane @ Rollingwood	Left turn accidents	Left turn signalization
Sneath Lane @ Sequoia Ave.	Intersection sight distances	Signalization
Sneath Lane @ Commodore Drive	Intersection traffic density	Signalization
Sneath Lane @ N/B 280 Freeway Ramp	Left turn density and storage	Install left turn sig- nalization and increase left turn storage lane
Cherry Ave. @ Bayhill Drive	Intersection traffic density	Signalization
Sneath Lane @ Huntington Ave.	Intersection density and left turns	Left turn signalization

In addition to these intersection improvements, further study should be made regarding the possibility of the need for an additional lane to be added westbound on San Bruno Ave. between Cherry and northbound 280 because of diminishing roadway capacity on this segment; and it is also recommended that Bayhill Drive between Elm and El Camino be extended.

Improvements at these intersections should help improve traffic flow and left turns at the designated intersections. These improvements are considered appropriate for the levels of intersection capacity in each instance. More elaborate improvements (with the exception of the extension of Bayhill Drive and widening of San Bruno Ave. between Cherry and Route 280) are not considered necessary based on the current and projected traffic volumes for San Bruno (see Exhibit A).

2. Action Programs to Ensure Driver and Pedestrian Safety (time frame - short range - 1-3 years)

a. Speeding in neighborhoods

Various methods can be employed to reduce speeding in residential areas, of which increased speed limit enforcement and renewed emphasis on traffic safety education are often the most effective. The main speeding problem in San Bruno is in the hilly areas where it has been noticed that drivers exceed the posted 25 mph limit by 5-10 mph on Crestmoor Drive, San Anselmo Ave. (in the flatlands), Fleetwood Drive (north end), and Shelter Creek Lane. Drivers on these streets drive at speeds that they perceive as safe while nearby residents complain (and by doing so perceive) that the cars are going too fast. Whether more elaborate methods than increased enforcement and traffic safety education are desirable should be a function of the application of objective criteria on traffic volumes and accidents to establish warrants for these more elaborate mechanisms. The City should establish a program whereby speeding problems in residential neighborhoods can be identified in a systematic manner and studied so that appropriate mitigation measures may be taken. A list of possible physical devices for protecting neighborhoods from undesirable traffic intrusion and speeding in order of effectiveness as listed in Appendix B.

b. Parking in residential neighborhoods

Parking in residential neighborhoods is a problem that is common to many suburban areas. Excessive on-street parking can impair the general efficiency and utility of city streets. Secondly, parked vehicles on the narrower residential streets may impair the passage of emergency equipment, and restrict sight distances which are so important in residential areas where children are apt to be playing. Thirdly, the visual impact of high density on-street parking is considered by some to be negative.

With regard to this issue of on-street parking it is suggested that the City employ more careful enforcement of the existing parking regulations including utilization of existing garage spaces for parking and restrictions on on-street vehicle parking for extended periods of time.

c. Pedestrian-vehicular conflicts

The most serious pedestrian-vehicular conflicts occur at intersections and there are several devices to deal with this problem. Traffic and pedestrian signals are the most effective mechanisms for controlling potentially

hazardous intersections and are recommended for the intersections of El Camino Real, San Felipe, El Camino, and Santa Lucia, and Sneath Lane and Engvall Road. Further discussion of traffic and pedestrian signals and other traffic control devices for general consideration, such as chokers, stop signs, and crosswalks are discussed in Appendix B.

d. Turning radii and sight distances

There are instances of sight distance problems, such as the vertical sight distance problem at El Camino Real and San Felipe that, as previously mentioned, can be corrected by signalization. An alternative to signalization to solve this problem would be to restrict parking on either side of the street for improved visibility.

Crystal Springs Road, which is a 2 lane roadway between Donner and Route 280 and currently accommodates 6,200 average daily vehicle trips, has several areas where turning radii and sight distances do not meet engineering standards for such roadways. When certain combinations of usage, pavement width, turning radii, and sight distances are combined, a condition can develop which might lead to an increased incidence of accidents. Should there be a significant increase in accidents on this roadway, an analysis should be made to determine what corrective action is necessary. Since this road has been identified as a scenic corridor in the Scenic Highways Element, any proposed alteration of this roadway should be designed to mitigate negative impacts on the scenic quality of the road.

3. Action Programs to Encourage Greater Use of Public Transportation (time frame - short range - 1-3 years and mid range - 5 years)

The City has applied, under The Transportation Development Act of 1971, and will soon undertake the operation of five 21 passenger buses on a 3-route local transit system designed to provide good east-west transit service among the principal commercial, industrial, and residential areas of the City, as well as feeder service to inter-city Greyhound and Southern Pacific Railroad transportation services (see Exhibit C). Connections with new neighboring systems in South San Francisco and Pacifica are also planned. The San Bruno transit system is still under study at this time and no final decisions have been made regarding routes, level of transit service or equipment. When routes have been finally determined, they will be incorporated as an amendment to the Circulation Element.

Once in operation, the local transit system should be periodically monitored by City staff to ensure that the transportation system is meeting the needs of residents in San Bruno and that it provides proper connections to neighboring local systems and to Greyhound and Southern Pacific, especially during commuter hours.

The City should also work closely with Greyhound, Southern Pacific, BART, and the Metropolitan Transportation Commission to ensure proper maintenance and upgrading of the Southern Pacific Station, and proper scheduling

of Greyhound and Southern Pacific service to meet the needs of San Bruno residents. It will also be important for the City to make known its views on a BART extension through San Bruno (and possible station at Tanforan) and possibilities regarding an overall upgrading of Southern Pacific Railroad Service.

Major transportation services must function on a regional basis. However, access to major transportation services is a key factor and if the services do not provide proper delivery of passengers to their work area, they are of limited value. In an effort to improve commuter travel, the City should encourage further study of the following alternatives:

- Encourage more direct service between the Southern Pacific 4th and Townsend Depot in San Francisco and major San Francisco work centers.
- Encourage Greyhound and/or other transit systems providing major commute service into San Francisco for San Mateo residents to provide service at the San Francisco Transbay Terminal. The current Greyhound station at 7th and Mission is too far southwest of major San Francisco work centers.
- Encourage Bay Area employers to institute "flex-time" work hours, thereby staggering the peak commute transportation hours.

Lastly, San Bruno should support a low fare structure for users of Greyhound and Southern Pacific until a County-wide bus system is in operation in San Mateo County. It is currently the City's intention to explore County operation of the local San Bruno bus system at that point when the County is ready to commence County-wide bus transit services.

Implementation of local and County-wide bus service as well as better connections to existing and new regional transit service will help reduce the number of automobile work trips as well as provide new public transportation services to serve unmet transportation needs of San Bruno and peninsula residents.

The initial San Bruno transit system is aimed at serving a service area comprised of 92% of the local population (about 35,000 persons) including 2,375 individuals over 62 years of age and 12,775 under 18. The daily anticipated patronage of 600 riders plus weekend charter ridership is small, but could potentially increase with the advent of improvements to the local service over time, increased public awareness, and commencement of the County-wide bus service. More elaborate local service is not considered necessary at this time since the service is just beginning and since service increases could be potentially absorbed by County Transit operations.

4. Action Programs to Mitigate Work Trip Travel (time frame - short range - 1-3 years, and mid range - 5 years)*

*See also Appendix on Air Quality which describes in detail the emerging Bay Area Air Quality Maintenance Plan.

The City should work with private and other public employers in San Bruno to provide employees of establishments in San Bruno with incentives for car-pooling, such as preferential treatment at off-street parking lots. The City should study its existing parking regulations and consider reducing the amount of parking needed for certain land uses where alternatives to the auto exist. Although currently parking lots in the City are not on the whole used to capacity, new developments (such as the Bayhill commercial-office development) will undoubtedly attract employees and their own patronage from within and outside the City. It should be pointed out that mixed use developments (discussed in more detail in the Housing Element) where residential traffic origins and employment destinations occur in a single location, maximize usage of available roadway capacity to the extent of encouraging use of both sides of roadways, especially during rush hours.

Because San Bruno is essentially a net out-commuting city, information about car-pooling should be made available to residents. While car-pooling is only effective on a voluntary basis, increases in gasoline prices, parking rates, and traffic congestion may make this an attractive alternative to limited vehicle occupancy work trips. Bay Area commuters are now able to take part in a pilot voluntary car pool program aimed at helping them cope with the increasing costs and consequences of driving to work. Called RIDES for Bay Area Commuters, the program has been developed in cooperation with the California Department of Transportation, the Federal Highway Administration, the Bureau of Census and the Association of Bay Area Governments. RIDES is sponsored by the California State Automobile Association (AAA), The Hibernia Bank, television station KPIX, and radio station KSAN. Other participating agencies are the Metropolitan Transportation Commission, the State Toll Bridge Administration, the Golden Gate Bridge, Highway and Transportation District, and the California Energy Planning Council.

The RIDES program is continuing to distribute short questionnaires throughout the nine Bay Area counties on a broad basis. Commuters tell where they live, where they work, what time they must be at work, and their telephone numbers. Completed questionnaires are processed by computer to match names of people living in the same neighborhood and driving to the same general location at the same time. After commuter match-up, commuters receive a list of names and telephone numbers and the individual commuter then telephones listed persons to form a car pool. A special information kit is available to businesses to encourage their employees to take part in RIDES by offering them appropriate incentives for car-pooling. Gradual use of the car-pooling program by San Bruno residents and workers would, over time, significantly alleviate problems of work trip travel within San Bruno and between San Bruno and other destinations. More elaborate means of mitigating the effects of work trip travel, such as preferential lanes for buses in San Bruno or increased roadway capacity are not considered necessary because of the margin of capacity available for vehicles traveling on San Bruno streets.

5. Action Programs to Ensure Proper Separation of local and through Traffic (time frame - mid-range - 5 years)

Once the Route 380 link between 280 and 101 becomes fully operational, it is likely that much traffic now using San Bruno Ave. (especially between

Seventh Ave. and El Camino Real) for connections to 101 and for employment destinations east of 101 will be diverted to 380 at ramp locations at El Camino Real and 380 so that traffic volumes on San Bruno (now at about 40,000 average daily vehicles near 7th Ave.) will drop to approximately 11,200 average daily trips in 1990. However, it is likely that this new projection for San Bruno is conservative since local drivers may continue to drive San Bruno in the peak hour out of habit and because it is an alternative route to destinations east of 101. In this eventuality, introducing a 16 foot median strip and two 14 foot moving lanes would ensure appropriate volumes of traffic on this street and improve the visual appearance of lower San Bruno Ave.

6. Action Programs to Ensure Protection of Neighborhoods from Adverse Circulation Impacts (time frame - long range - 10 years)

Abatement of Noise from Roadways and Railroads

The Draft Noise Element for San Bruno, completed in July 1975, recommends various methods of noise abatement. These are as follows:

a. Roadways

- Establishment of an Environmental Standards Section in the Engineering Department and a Noise-Abatement Enforcement Unit in the Police Department of the City of San Bruno. These units would identify violators of noise emission standards, verify the noise levels produced by vehicles, and require compliance to the City's established noise standards.

- Enlisting cooperation by present and future bus operators to reduce noise emission from gasoline and diesel-powered engines.

- Examination of the possibility of placing bus stops 150 feet downstream from school sites.

- Establishment of noise criteria for evaluation of City owned vehicles and verification of performance.

- Reconsideration of the need for one or more truck arteries and placement with limitations on the use of trucks on San Bruno Ave. and downtown San Mateo Ave.

- Enlisting the cooperation of the Airport's Commission and the City and the City and County of San Francisco to ensure collective mass transit access to the Airport, to serve any excess of passengers over the annual volume of 17 million.

- Construction of aesthetically pleasing noise barriers along certain segments of freeway routes 280, 380, and 101, and selected streets in San Bruno.

b. Railroads

- Enlisting the cooperation of Southern Pacific Railroad to ensure that the rolling stock meets Federal standards, surveying the existing trackage in San Bruno and requesting needed repairs, and requesting reduced use of train-borne acoustical signals.

- Exploration, in conjunction with the City of South San Francisco and Southern Pacific Railroad, of the feasibility of alternate track arrangements to allow freight trains to avoid making a noisy sharp turn along the Bayshore Circle.

- Ensuring that future rail transit lines be constructed at sufficient horizontal distance or vertical separation from existing noise-sensitive land uses.

- Enlisting the cooperation of Southern Pacific Railroad for the erection of aesthetically pleasing noise barriers along certain route segments and for the City to maintain landscaping along same.

- Enlisting the cooperation of Southern Pacific Railroad to improve the gate timing at Huntington Ave. and San Bruno Ave. as the present timing allows over congestion in four directions.

7. Action Programs to Ensure Continued Street Maintenance and Beautification (time frame - all phases)

Maintenance - the current Department of Public Works program of street maintenance is structured to resurfacing and reconstructing streets where necessary every 15 years. The consistent nature of the problem ensures that every street is examined for defects and repaved every 15 years. At this time everything east of Skyline Blvd. has been done and after completing the Pacific Heights area, work will commence in the Lomita Park neighborhood which was done before 1960. As a matter of course, handicapped curb cuts are put in place for every curb that is reconstructed. The City should modify the maintenance program and employ a more specific strategy of earmarking those curbs that would be best modified as handicapped curb cuts for wheelchairs, especially in the downtown area.

Joint use planning - the Scenic Highways Element of the General Plan includes the following roadways as existing or planned scenic roadways: Interstate 280, Interstate 380, Skyline Blvd., Skyline Scenic Recreation Route, El Camino Real, Crystal Springs Road, San Bruno Ave., Sneath Lane, San Mateo Ave., and Huntington Ave. Concerns here involve the coordination of landscaping and right-of-way treatment (including pedestrian paths and trails) with roadway improvements to improve traffic flow and safety, transit stop design, etc.

Even the most optimistic traffic projections do not envision a major diversion of trips from autos to bicycles or by walking. However, wherever

possible, bikeways and pedestrian paths and trails should be developed in San Bruno with adequate safety provisions and aesthetically pleasing design because of their potential use by recreation, work, and shopping travelers. The following roadways, as called for in the Scenic Highways Element,* are already designated as bike routes: College Drive, from Skyline Blvd. to Skyline College; Crestmoor Drive; Fleetwood Drive; and Jenevein Ave. The Scenic Highways Element calls for expanding the bike routes to include Susan and Fasman Drives in Pacific Heights, and San Anselmo and San Felipe Avenues in Lomita Park. Prior to extension of the bike route on San Felipe Ave., signilization at El Camino Real would be necessary (see Section IV.1.) Future bike routes to consider would be the streets in the Bayhill Development and a bike route linking the proposed Cherry Park with Crestmoor Canyon.

Street beautification - El Camino Real, San Bruno Ave., and Sneath Lane are all major thoroughfares that developed over time by the City and adjacent property owners could enliven these streets as major form elements in the City. Individual studies of these thoroughfares are necessary to document design constraints and potentials.

Each street is unique, with its own design constraints and potentials, but the design of all major trafficways, and development along them, should be guided as much as possible by certain general principles. Best results occur when several of these principles work together, and the City should consider these principles in the street beautification program.

There should be strong contrasts, such as between commercial and residential stretches and between intensively built-up sections and lower-density ones. Mile after mile of the same pattern is monotonous.

While contrasts are important, a trafficway should also have some consistent underlying theme: planting, luminaries, street width, or relationship to a natural feature could lend consistence to a trafficway.

In most situations the buildings along a street should be high enough (in relation to street width) and continuous enough to create a well defined street channel with some sense of "enclosure." Exceptions can occur where, for example, lack of enclosure is desirable where a view can be opened up. Also, the degree of enclosure should vary along a street to create contrasts between different sections.

A trafficway should, where possible, run next to open spaces, or take advantage of interesting topography by following a valley, shoreline, or other feature. Trafficways should almost always have trees or other significant planting--particularly long trafficways lacking enclosure. All utility lines should be underground.

*San Bruno Planning Department, Scenic Highways Element, San Bruno, 1974, pp. 63-64.

- light poles, street furniture

Along the typical major streets there is a motley confusing array of street "furniture" of every possible size, shape, and color-- luminaries overhead utility poles and wires, fireplugs, fire alarms, mail boxes, sundry street and traffic signs, and (on commercial streets) private signs and billboards. Along any given street, the light poles should have uniform design, with height and spacing appropriate to the class of street.

On all streets, the quality of public directional and informational signs should be improved. There is today room for imagination in the design and placement of these ever-present elements in the street scene. What is needed is the introduction of more good graphics, such as is happening elsewhere in the world. Signs could then become bright, cheerful, positive elements of a street.

- intersections

Intersections--the "joints" that tie together the street network--not only are critical in determining the traffic capacity, but also have a crucial effect on a street's visual quality and on a driver's ability to find his way through the city.

Major buildings should be encouraged to locate so that they highlight, and enhance, important intersections.

8. Action Program to Ensure Proper Coordination of Development Planning with Traffic Capacities (time frame - all phases)

To ensure proper coordination of land development activities, especially commercial development in the Bayhill and possibly Tanforan areas, specific design review of development proposals by the Planning and Public Works Departments and Planning Commission should take place to make certain that adjacent traffic capacities are able to accommodate increased traffic loads. If roadway improvements are necessary, a specific program of improvements (including necessary off-site improvements) should be agreed to between the City and developer before approval is granted to new development. The City has already determined that there are portions of Bayhill which require more study with regard to traffic and circulation patterns, and this study should be completed as soon as possible. Implementation of this action program would provide the City with assurances that land development proposals are properly related to the circulation system.

9. Action Programs to Ensure Local Coordination with Area and Regional Transportation Planning and Operating Agencies (time frame - all phases)

The City should undertake periodic reviews of the status of area highway projects and improvements, San Francisco Airport expansion planning, and County and regional transit planning to enable the City to work effectively with area and regional circulation systems of which the City's transportation system is a part. Correspondingly, the City should make clear its position on new circulation proposals to other agencies having jurisdiction in or operating in or near San Bruno.

V. Implementation/Continuing Evaluation and Planning Process

In order to effectively implement the recommendations of the Circulation Element, it will be necessary to adopt specific priorities for the various actions recommended, secure the funding to finance them, and monitor the effects of the transportation improvements after they are in place for a certain period. Coordination of City actions with County and Regional agencies will be required to reduce the automobile travel volumes in the work commute (with consequent reduction in air and noise pollution impacts in San Bruno neighborhoods).

In addition, coordination with the Metropolitan Transportation Commission and the California Department of Transportation on necessary remedial improvements to highway segments in and near San Bruno, as called for in the Noise Element, will also be necessary for the City to undertake.

The exact costs of implementing the Action Programs and the precise nature of Action Programs to undertake should be studied further, once priorities are determined by the City. The task will entail necessary field and analytical surveys.

Installation of traffic control mechanisms should include costs of the installations as well as maintenance and operations costs.

Periodic review and update of the Circulation Element should include the following activities:

- Coordination of local transportation planning with the County Planning and Public Works Departments and pertinent regional agencies.
- Review by San Bruno Traffic Safety Committee.
- Coordination of San Bruno Planning and Public Works staff review of action program implementation to be followed by Planning Commission review and approval.
- City staff coordination of the Circulation Element with other General Plan elements, particularly the Noise, Open Space, Safety, Seismic, Housing and Land Use Elements.
- More detailed study of action programs and monitoring their effectiveness on a periodic basis.
- Review and update of Circulation Element as regional decisions are made on the overall upgrading of Southern Pacific Railroad service and BART.

A. Federal and State Financing Mechanisms

Procedurally, the California Department of Transportation, Division of Highways, is responsible for roadway improvements and maintenance for

El Camino Real, Skyline Blvd., and Routes 101, 280, and 380 since they are a part of the State Highway System. The City should therefore coordinate its improvement plans and recommendations for these roadways with the State to ensure timely completion of planned improvements.

1. Gas Tax Monies (Section 2107)

Of the \$.04 tax on each gallon of gasoline sold in San Bruno a certain amount, apportioned by State allocation formulas, is available to San Bruno annually for local street maintenance and capital improvements.

2. Gas Tax Monies (Section 2106)

A portion of the gas tax monies is available for maintenance and improvements for roadways listed in the City's Select Street System (see Exhibit B) which is made up of arterial and collector streets in San Bruno.

3. Federal Aid Urban Monies (Secondary)

This program is administered by San Mateo County which receives funds on the basis of County annual applications to the Metropolitan Transportation Commission. Major street and roadway improvements, including local street improvements, can be funded through this program. The 1975-76 County priority list of projects does not include any projects for San Bruno.

4. California Transportation Development Act of 1971

This Act allocates the equivalent of a 1/4 cent sales tax (on all taxable items, including gasoline sales) into special trust accounts known as Local Transportation Funds. These local funds are expended on local transportation needs as determined by the Metropolitan Transportation Commission. San Bruno has already applied for \$269,705 as its share of the County Transportation Fund to finance its proposed transit system.

5. Housing and Community Development Act of 1974

San Bruno can participate in the County's 2nd and 3rd year Housing and Community Development Applications by requesting funds within the Engineering and Roads section and Social Services section of the Act. Street and storm drain improvements and sidewalk improvements would be eligible for funding as would programs such as a mini-van for senior citizens (applied for by Millbrae in the 1974 County application). The Housing and Community Development Act also provides funds for removal of material and architectural barriers which restrict the mobility and accessibility of elderly and handicapped persons, and could be used for curb cuts and other street improvements for the handicapped. It is expected, however, that the City's current community center project will utilize most of San Bruno's available funding.

B. Other Funding Sources for Transportation Improvements

It should be noted that while these other funding sources do exist, the criteria required for eligibility many times will not correspond to the City's needs--consequently, the City would not qualify for funds in these instances.

Among these are:

1. Improvement Act of 1911 empowers the legislative body of a city to make street and utility improvements and to charge the cost to the owners of the benefited property. Serial bonds may be sold to cover costs of improvements, and the city may collect assessments to repay the bond issue either by special billing or at the time taxes are paid. This legislation is the source of most California city ordinances authorizing street improvements. Its value is limited in that provision is not made for improvement of private lands.
2. Municipal Improvement Act of 1913 authorizes municipalities and counties to make improvements or to provide public services along public streets. The act is most frequently employed to administer assessment districts using bonds sold under the provisions of the Improvement Act of 1911 or the Improvement Bond Act of 1915. Recent amendments give cities the option of covering costs of some services through ad valorem assessments on lands within the affected district. This assessment, however, may not exceed 25 cents for each \$100 of assessed valuation.
3. Improvement Bond Act of 1915 provides an alternative to 1911 act assessment bonds covering the costs of public street improvements. With the 1915 act, bonds are secured by all district property--not just individual parcels--and by a contingency tax on the entire community (up to 10 cents for each \$100 of assessed valuation) if needed to pay deficiencies.
4. Revenue Bond Law of 1941 authorizes sale of revenue bonds to finance municipal parking projects. These bonds, secured by pledged parking revenues (generally net revenues from on-street meters and gross revenues from off-street parking), may be sold after majority approval is obtained in a city-wide election. In some charter cities, the charter may authorize the city council to sell this type of bond without voter endorsement.
5. Pedestrian Mall Law of 1960 enables main streets in commercial areas to be restricted and improved for pedestrian use. Costs of development may be assessed against the benefited lands or may be financed with other available funds of the city--including urban renewal funds.
6. Community Redevelopment Law is the act under which California communities participate in urban renewal projects. It provides for the formation of an agency--which may accept financial assistance from public and private sources--to prepare and carry out plans for the improvement, rehabilitation, and redevelopment of specific areas deemed blighted. Tax increment bonds can be sold to finance such projects. Cities, however, may also use current revenues, ad valorem taxes, sales taxes on funds obtained under the provisions of the Improvement Act of 1911 or the Improvement Bond Act of 1915.

VI. Environmental Impact

In development of the Circulation Element of the General Plan, major consideration has been given to the effects the policies and especially the action programs (the actions necessary to implement the policies) will have on the environment. The Element has been developed with a careful weighing of the effects of alternatives on the social, economic, and physical well being of San Bruno residents.

A. Description of Project

The location and boundaries of the proposed project are found on Exhibit A. The project location is also shown on a regional map found in The Land Use Element of the General Plan. A statement of the objectives sought by the project is found in Section II. Circulation Goals, Objectives and Policies. A general description of the project's characteristics is found in Section IV. Evaluation of and Recommendations for Action Programs for Circulation.

B. Description of Environmental Setting

A description of the environmental setting is found in Section III. Circulation Background and Problems, subsections A. Physical Context, B. Travel Characteristics, C. Characteristics of Circulation System, and D. Circulation Needs.

C. Environmental Impact

The primary impact of the adoption of the Circulation Element will be on the short, mid, and long-range management of private vehicular and public transportation elements of the City. This will include a gradual and long-term reduction in the number of limited occupancy automobile trips, improved public transportation, improved safety at presently dangerous intersections and roadway segments, improved traffic flow, long term beautification of roadway rights-of-way, and an improved neighborhood environment. Noise and air pollution problems would continue although reduced overall in persistence. In some areas of the City noise and air pollution impacts would increase as a result of additional traffic, although these negative impacts can be partially offset by mitigation measures. Section IV. Evaluation of and Recommendations for Action Programs for Circulation contains additional information on environmental impacts of circulation policies and programs.

D. Any Adverse Environmental Effects Which Cannot be Avoided if the Proposal is Implemented

The adoption of the Circulation Element will serve to control adverse effects of traffic flow and volume, air pollution and noise pollution. However, some unavoidable increases in traffic and related air and noise impacts can be expected where traffic flow is increased. Land alterations will also unavoidably occur at the proposed westbound land widening on San Bruno Ave. near 280. Further discussion of adverse environmental effects is found in Section IV.

E. Mitigation Measures Proposed to Minimize the Impact

Proposed action programs (see Section IV) of the plan are the mitigation measures of the Circulation Element. These programs will, over time, reduce the under-utilization of streets and highways by increasing the number of passengers per vehicle on work trips, improve public transportation, improve the safety of flow of traffic, foster a better relationship between land development and transportation capacity, maintain and beautify major streets, mitigate air and noise pollution and foster energy conservation, and cause more specific coordination of transportation improvements between San Bruno and area and regional jurisdictions.

F. Alternatives to the Proposed Action

Retention of the current plan for Circulation would perpetuate a continuing reliance on the automobile for movement in the City. Since the revised Circulation Element proposes a system of traffic management in San Bruno (mostly the improvement of existing facilities), the basic alternatives to the Plan are more elaborate measures to meet San Bruno's circulation needs. Explanation of needs is found in Section III. Circulation Background and Problems, and alternatives to programs are found in Section IV.

G. The Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity

Roadway improvements (see Section IV) are to be developed as needed in the short run and not to generate traffic over the long run. Increased use of public transportation within the City and for trips outside the City should contribute to mitigating the impacts of private automobile usage in the future.

H. Any Irreversible Environmental Changes Which Would be Involved in the Proposal Should it be Implemented

The minimal lane widening recommendation for an additional westbound lane on San Bruno Ave. would involve permanent land alteration (see p. 18).

I. The Growth Inducing Impact of the Proposed Action

Since the Plan consists of minimal improvements to the existing circulation system, and since San Bruno has little vacant land left for development (see San Bruno Housing Element), little growth inducing impact is anticipated. The completion of Route 380 will add to increased accessibility of San Francisco Airport, thus causing an increased ability of the airport to expand its operations because of improved ground access. As mentioned in Section IV, San Bruno should coordinate its future planning with the airport and California Department of Transportation to ensure that impacts from increased highway travel in and near San Bruno do not cause significant neighborhood impacts in the City.

Persons consulted in preparation of the Environmental Impact Report Section of the Circulation Element are listed in the back of the Circulation Element under "Persons Consulted in Preparation of this Document."

Table 1. Where Do San Bruno Residents Work and How Do They Get to Work (by Census Tract)?

Census Tracts	6036	6037	6038	6039	6040	6041	6042
All Workers	1919	2658	2741	2028	1560	2930	1333
Private auto: Driver	1536	2194	1884	1526	1123	2180	909
Passenger	156	253	235	209	187	256	168
Bus (Greyhound)	27	31	0	91	90	137	57
Train (Southern Pacific)	45	32	70	48	72	91	34
Walked to work	22	13	1	39	24	135	110
Worked at home	--	42	10	44	6	45	11
Other	83	87	11	71	58	36	44
Inside SMSA*	1752	2454	1523	1926	1377	2665	1120
S.F.-(CBD)**	261	310	200	211	161	173	102
S.F.-Remainder	634	352	100	452	397	527	217
Oakland - CBD	--	3	--	--	--	11	--
Oakland-Remainder	10	17	14	24	5	11	--
Remainder-Alameda Co.	17	17	10	13	12	6	21
San Mateo Co.	324	1150	1441	1221	794	1932	637
Contra Costa Co.	--	--	10	--	9	--	13
Marin Co.	6	--	--	--	--	--	--
Outside SMSA	77	13	85	37	57	31	51
Place of work not reported	90	171	131	65	126	184	92

* Standard Metropolitan Statistical Area

** Central Business District

Source: 1970 Census, P-2-Social Characteristics of the Population.

Table 2. Where Do San Bruno Residents Work?

	<u>Number of Persons</u>
All workers	15169
Inside SMSA**	
San Francisco CBD*-Downtown	1423
Other	3879
Oakland CBD-Downtown	19
Other	91
Remainder-Alameda Co.	120
San Mateo County	8307
Contra Costa Co.	44
Marin Co.	6
Outside SMSA**	421
Place of work not reported	859

* Central Business District

** Standard Metropolitan Statistical Area

Source: 1970 Census, P-2 - Social Characteristics of the
Population

Table 3. How Do San Bruno Residents Get to Work?

	<u>Number of Persons</u>
All workers	15169
Private auto	
Driver	11722
Passenger	1514
Bus (Greyhound)	513
Train (Southern Pacific)	395
Walked to work	395
Worked at home	168
Other	462

Source: 1970 Census, P-2 - Social Characteristics
of the Population

Table 4. Where Do San Mateo County Residents Work and How Do They Get to Work?

	<u>Number of Persons</u>
All workers	235,706
Private Auto	
Driver	176,184
Passenger	22,678
Bus	10,586
Train (Southern Pacific)	7,110
Walked to work	8,311
Worked at home	4,502
Other	6,335
Inside SMSA*	196,685
S.F.-CBD**	20,160
Remainder-S.F.	43,757
Oakland-CBD	161
Remainder-Oakland	1,393
Remainder-Alameda Co.	1,907
San Mateo Co.	128,493
Contra Costa Co.	479
Marin Co.	335
Outside SMSA	21,272
Place of work not reported	17,749

* Standard Metropolitan Statistical Area

** Central Business District

Source: 1970 Census, P-2 - Social Characteristics of the Population

Table 5. How Many Cars Do San Bruno Residents Own?

<u>Automobiles Available</u>	<u>Number of Households</u>
1	4831
2	4683
3 or more	1037
None	601

San Bruno: No. cars/household = 1.46

No. cars/capita = 0.45

San Mateo Co.: No. cars/capita = 0.49

Bay Area: No. cars/capita = 0.60

Source: 1970 Census, H-2 - Structural, Equipment,
and Financial Characteristics of Housing
units

Table 6. What Kind of Trips Do Bay Area Residents Take and How Do They Travel?

<u>Trip Purpose</u>	<u>Percent</u>			
	<u>Private Auto</u>	<u>Bus or Train</u>	<u>Walking</u>	<u>All Trips</u>
House-based				
Work	24.1	35.4	7.2	22.2
Personal Business	11.5	7.6	7.8	10.6
Social	7.3	2.3	6.1	6.7
Recreational	5.1	2.7	2.8	4.5
Shopping				
Convenience	10.8	2.4	11.9	10.3
Comparison	3.8	4.4	1.4	3.5
School	4.4	34.7	37.4	12.2
Other house-based	11.0	1.0	5.3	9.3
Non house-based	<u>22.0</u>	<u>9.5</u>	<u>20.1</u>	<u>20.7</u>
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
% of all trips	76	8	16	100

Source: Bay Area Transportation Study Commission,
Bay Area Transportation Report, Berkeley, 1969.

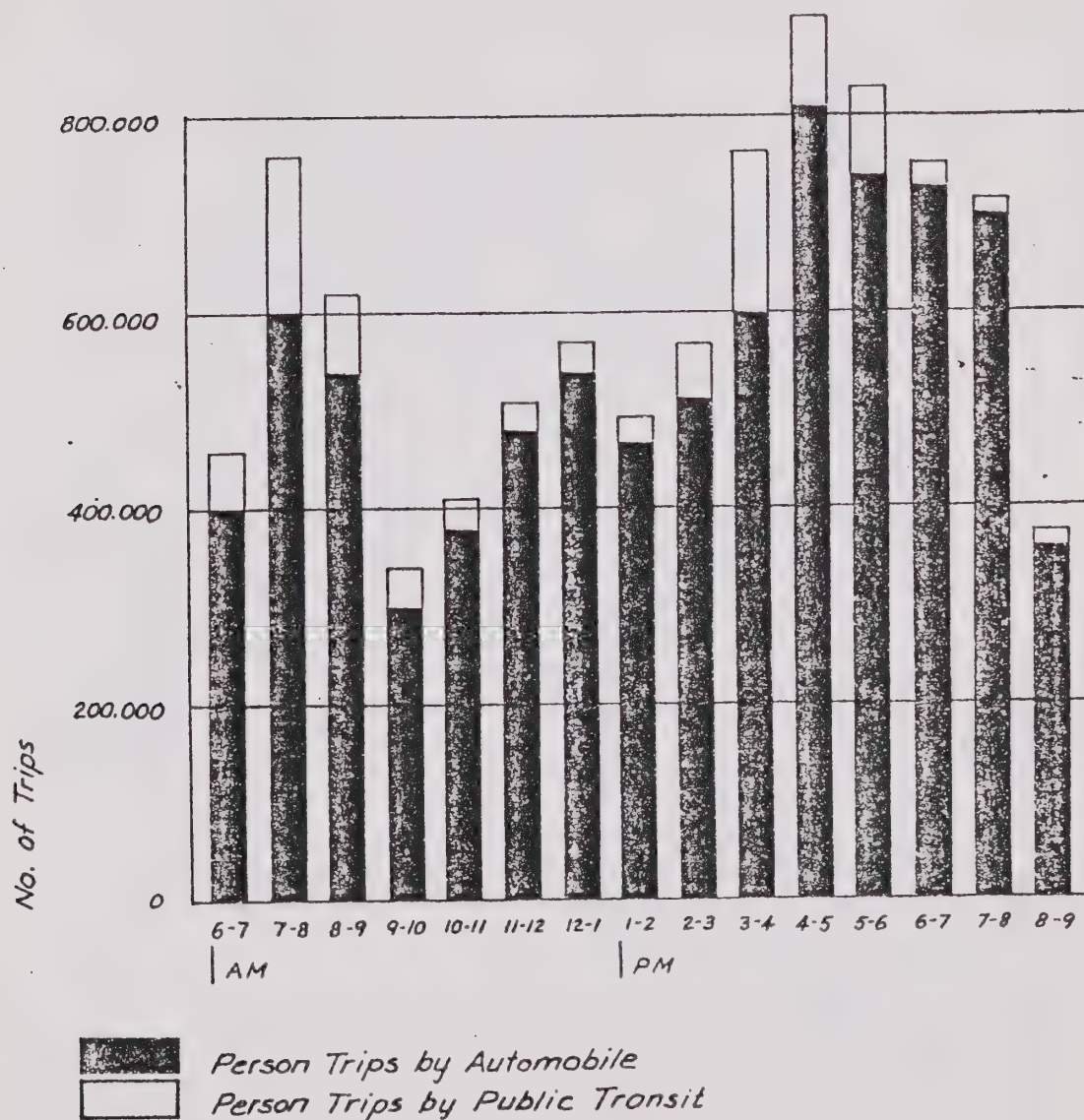
Table 7. How Many People in the Bay Area Travel in Cars for Weekday Trips (by Trip Purpose)?

<u>Trip Purpose</u>	Average Car Occupancy*
House-based	
School	2.76
Recreational	1.93
Social	1.62
Comparison shopping	1.46
Personal business	1.41
Convenience shopping	1.28
Work	1.18
Other house-based	1.81
Non house-based	<u>1.44</u>
All Purposes	1.44

*Person trips in autos divided by auto driver trips

Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, Berkeley, 1969.

Table 8. When Do Bay Area Residents Travel (By Time of Day - Importance of Peak-Hour or House-to-work Travel)?



Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, Berkeley, 1969.

Planning
Urban Design
Community Participation

1932 Polk Street
San Francisco Ca 94109

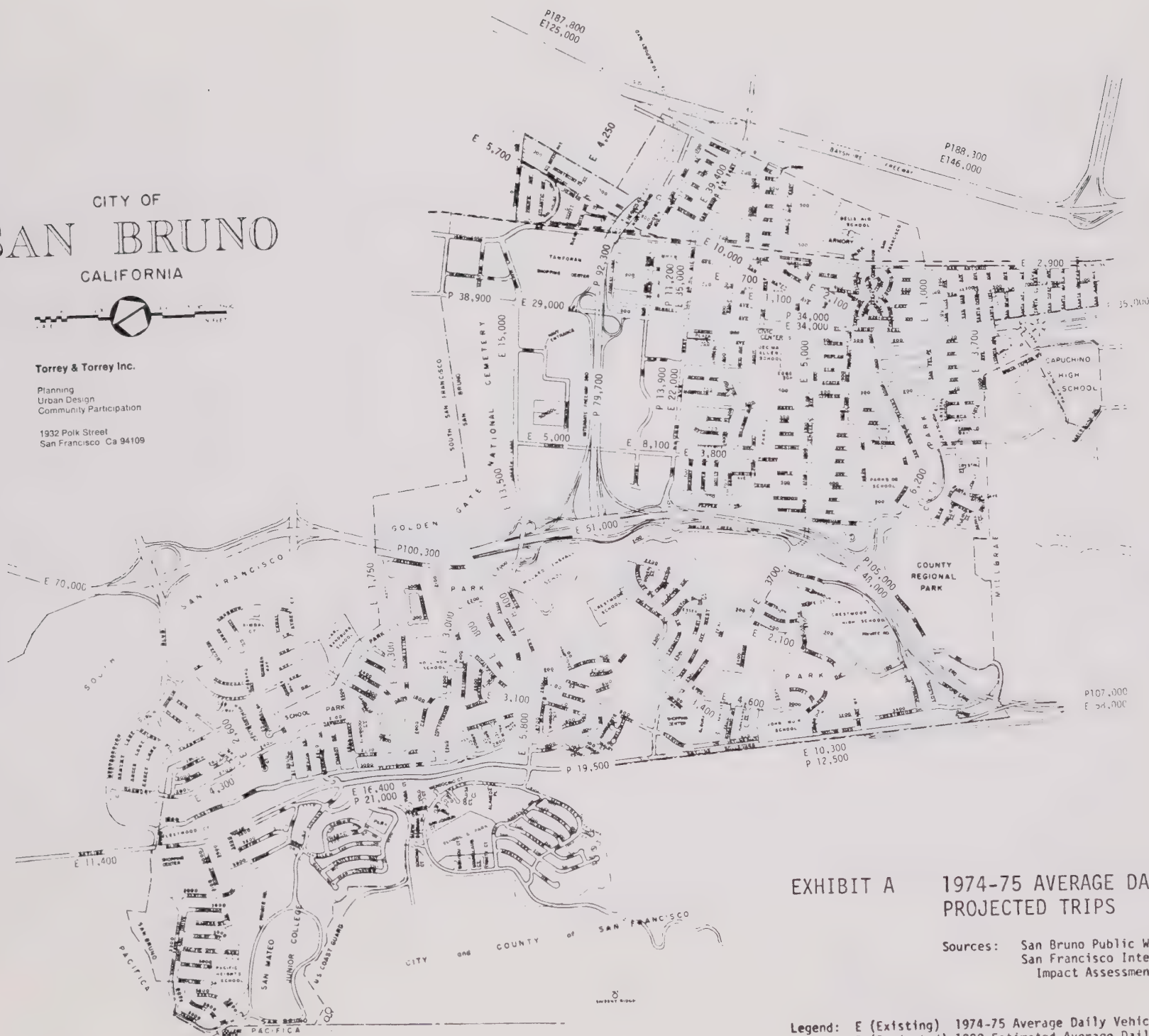


EXHIBIT A 1974-75 AVERAGE DAILY VEHICLE TRIPS/
PROJECTED TRIPS

Sources: San Bruno Public Works Dept.
San Francisco International Airport Environment
Impact Assessment Report

Legend: E (Existing) 1974-75 Average Daily Vehicle Trips
P (Projected) 1990 Estimated Average Daily Vehicle Trips
(Without Rapid Transit)

CITY OF
SAN BRUNO
CALIFORNIA



Torrey & Torrey Inc.

Planning
Urban Design
Community Participation

1932 Polk Street
San Francisco Ca 94109

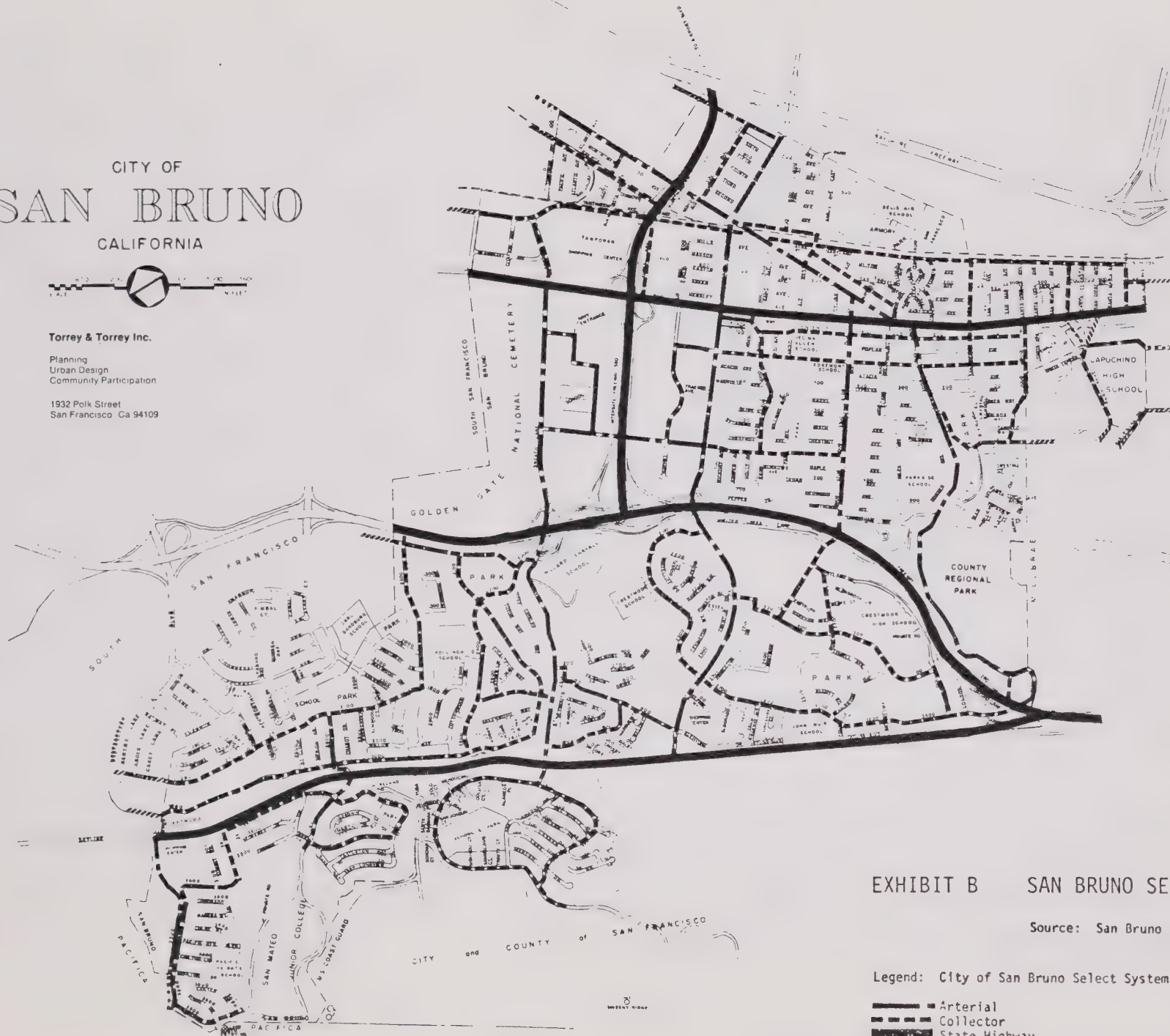


EXHIBIT B SAN BRUNO SELECT STREET SYSTEM

Source: San Bruno Public Works Department

Legend: City of San Bruno Select System

- Arterial
- - - Collector
- State Highway
- Connecting Select System routes of contiguous jurisdictions
- Arterial
- Collector

CITY OF
SAN BRUNO
CALIFORNIA



Torrey & Torrey Inc.

Planning
Urban Design
Community Participation

1932 Polk Street
San Francisco Ca 94109

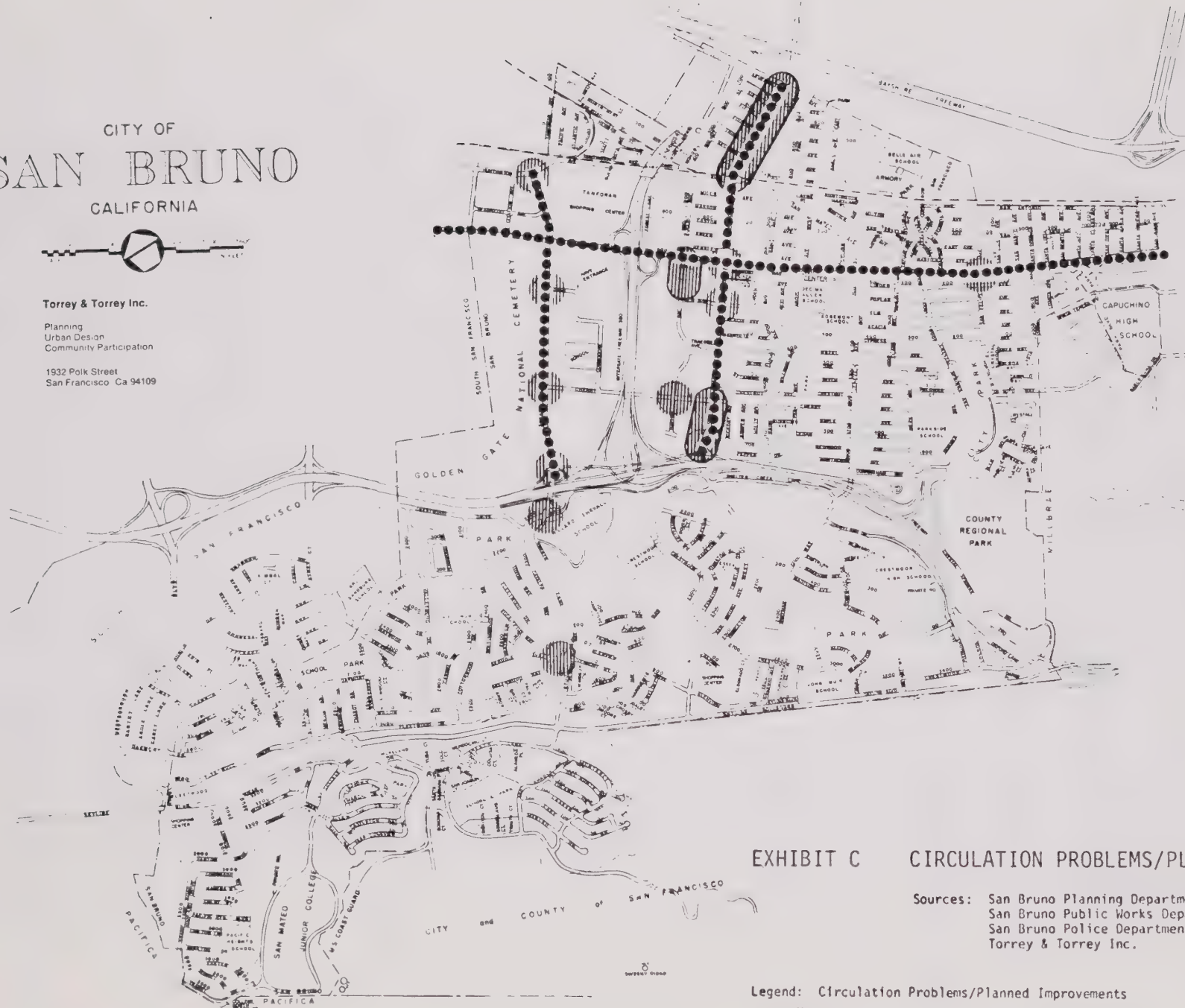


EXHIBIT C CIRCULATION PROBLEMS/PLANNED IMPROVEMENTS

Sources: San Bruno Planning Department
San Bruno Public Works Department
San Bruno Police Department
Torrey & Torrey Inc.

Legend: Circulation Problems/Planned Improvements

- Intersection Problems/Planned Improvements
- Right-of-way Problems/Planned Improvements
- Comprehensive Street Beautification Improvements

VII. Bibliography

- Bay Area Transportation Study Commission, Bay Area Transportation Report, Berkeley, May 1969.
- California Department of Transportation District 04, Draft Environmental Impact Statement on Route 380 Portola Freeway and Alternatives, May 14, 1974.
- City of San Bruno, Draft Housing Element, July 14, 1975 (prepared by Torrey & Torrey Inc.).
- City of San Bruno, Environmental Impact Report on Sneath Lane Reconstruction from Freeway 280 to Skyline Blvd., San Bruno, March 6, 1974.
- City of San Bruno, Environmental Impact Report on Bayhill, San Bruno, San Bruno, undated.
- City of San Bruno, Draft Environmental Impact Report Supplement for Lake Amir Office Park in the Bayhill Center, San Bruno, September, 1974.
- City of San Bruno, San Bruno Transit Funds claim for 1974-75, San Bruno, March 6, 1974.
- City of San Bruno, Street and Highway Plan, San Bruno, 1961.
- City of San Bruno, Open Space, Conservation, Scenic Highways Elements, San Bruno, 1974.
- City of San Bruno, Select Street System Map, San Bruno, 1969.
- City of San Bruno, Noise Element, San Bruno, 1975.
- City of San Bruno, Amended Land Use Plan, San Bruno, 1967.
- City of Millbrae, Basic Data and Background for 1974 General Plan, Millbrae, April, 1974.
- City of Millbrae, 1974 General Plan, Millbrae, June, 1974.
- City of Berkeley, Neighborhood Traffic Study, Berkeley, July, 1974.
- Highway Research Board, Highway Capacity Manual, Washington, D.C., 1965.
- Housing and Community Development Act 1974, Public Law 93-383, August 22, 1974.
- Metropolitan Transportation Commission, Regional Transportation Plans, Berkeley, August 28, 1974.
- Metropolitan Transportation Commission, The Feasibility of Upgrading Peninsula Passenger Rail Service, Berkeley, November, 1974.

National Safety Council Report, Automobile Accidents in San Bruno,
15, January 1975.

San Mateo County Engineering Department, San Mateo County Local Bus Transit
Study, San Francisco, June 10, 1974.

San Mateo County Planning Department, San Mateo County Master Plan, 1990,
Redwood City, January 14, 1964.

San Mateo County Planning Department, Housing and Community Development
Plan for San Mateo County, May 14, 1975.

Tri State Engineering Company, Draft Environmental Impact Report for An
Office Building in Bayhill Office Park, Redwood City, March 3, 1975.

APPENDIX A Relation of Transportation Planning to Air Pollution Reduction Programs

Air Pollution

Although San Bruno is generally built-up (not a great deal of new development is likely to occur) and no new additional traffic routes are proposed in this Element, it is important to note the relationship between growth and circulation facilities and air pollution levels in the City. In the case of San Bruno, the concern is not as much with preventing increases in air pollution levels generated by new circulation facilities, as with maintaining or reducing present pollution levels.

The significant issues with respect to maintenance of air quality in San Bruno are the future potential implementation of the evolving Bay Area Air Quality Maintenance Plan, increases in Vehicle Miles of Travel related to the San Francisco International Airport, and the local constraints and opportunities for maintaining and improving air quality in the City.

a. Bay Area Air Quality Maintenance Plan

The Bay Area Air Quality Maintenance Plan is presently evolving under the auspices of the California Air Resources Board, and a special Bay Area Advisory Committee appointed by this body. Although much of the work of this body is based on Environmental Protection Agency directives (as a result of implementing the Clean Air Act) which were considerably relaxed in 1974, certain provisions of the maintenance program may become mandatory in the future as a result of gas shortages or similar eventualities.

Several strategies have been proposed in preparation of this plan, including a car-pooling program for commuters; mass transit priority lanes and car pool priority lanes on freeways; provision of employee incentives for car-pooling and mass transit; and several strategies relating to management of parking supply, and gasoline limitations. Whereas the parking and gasoline limitation strategies have been indefinitely postponed, the other strategies have some possibility of being implemented within the next few years.

Although it is unlikely that these programs would be implemented before two years time, at the time that they are implemented, they will have significant implications for transportation for San Bruno residents, and will require a more detailed examination of transportation needs and priorities in the City.

Existing programs to reduce air pollution include the pilot voluntary car pool program and State Smog Control equipment requirements. Bay Area commuters are now able to take part in a pilot voluntary car pool program aimed at helping them cope with the increasing costs and consequences of driving to work. Called RIDES for Bay Area Commuters, the program has been developed in cooperation by the California Department of Transportation (CALTRANS), the Federal Highway Administration, the Bureau of the Census and the Association of Bay Area Governments. RIDES is sponsored by the California

State Automobile Association (AAA), The Hibernia Bank, television station KPIX and radio station KSAN. Other participating agencies are the Metropolitan Transportation Commission, the State Toll Bridge Administration, the Golden Gate Bridge Highway and Transportation District, and the California Energy Planning Council.

The RIDES program is continuing to distribute short questionnaires throughout the nine Bay Area counties on a broad basis. Commuters tell where they live, where they work, what time they must be at work and their telephone numbers. Completed questionnaires are processed by computer to match names of people living in the same neighborhood and driving to the same general location at the same time. After computer match-up, commuters receive a list of names and telephone numbers and the individual commuter then telephones listed persons to form a car pool. A specialized information kit is available to businesses to encourage their employees to take part in RIDES by offering them appropriate incentives to car pool.

At present, smog control equipment is required by the State of California and EPA regulations on transfer of car ownership (oxidizing catalyst retrofits).

b. Vehicle Miles of Travel to San Francisco Airport

As part of the Bay Area Regional Airport Systems Study (RASS), the Bay Area Air Pollution Control District performed a study in 1971 (Aviation Effect On Air Quality) to predict air quality conditions at several Bay Area airports, including SFIA. This study indicated that in 1972, aircraft contributed approximately 1.5 percent of all air contaminant emissions in the Bay region, and that by 1985, this contribution would increase to approximately 6.0 percent because of increased air travel together with decreased emissions from automotive sources.

The San Francisco Airports Commission, undertook a study in December, 1974 to provide current data on the effect of SFIA operations on air quality and to determine specifically the impact, if any, of the proposed terminal expansion on air quality. The study included air quality monitoring in the vicinity of SFIA, an emission inventory and dispersion modeling. This study indicated that increased passenger demand at SFIA will result in increases in airport-related VMT (Vehicle Miles of Travel). This increase, however, would not be aggravated by airport expansion but would be related to increases in passenger demand only, regardless of airport development.

The RASS and subsequent regional studies of the Bay region transportation system have recommended ultimate allocation of air passenger demand at SFIA of 31 million air passengers in 1990. This decision has been made with consideration of the overall impacts on the region, including transportation facilities, socioeconomic and environmental. The net effect of the regional decision is an unavoidable increase of SFIA-related VMT.

The City should establish a corrolary policy, in coordination with the regional agencies, to ensure monitoring of increases in VMT related to the airport and compliance with acceptable standards of resultant air pollution levels.

c. Local Constraints and Opportunities - Prevailing Climate

San Bruno's climate can be considered a constraint for maintenance of air quality since it is characterized by a condition which is not conducive to easy dispersion of pollutants into the atmosphere. Because of the frequency of temperature inversions and the amount of particulate matter and gasses emitted into the atmosphere, the prevalent westerly winds do not provide an adequate flushing of the air basin to prevent smog accumulation over the area.

The temperature inversions (warmer dry air, riding over cool marine air at varying heights between 1400 to 300 feet) create a layering effect in the atmosphere which limits the volume of air into which pollutants can be dispersed. Therefore, air pollution levels tend to increase and air quality decreases.*

This natural constraint suggests that the City should carefully appraise the air pollution implications of any proposed circulation facilities (in addition to effects of stationary sources) and utilize all available opportunities to reduce present pollution levels.

- Local bus system

Implementation of the local bus system in San Bruno represents a clear opportunity to improve present air quality in the City, and mitigate some of the negative pollution effects of future circulation facilities.

- San Mateo Bus System, SPRR, and Regional Systems

The City's encouragement and use of County-wide and regional transit systems (BART and/or upgrading of the Southern Pacific Railroad) would serve to reduce air pollution levels and improve air quality in the City and the air basin as a whole.

*Regional Planning Committee of San Mateo County, May, 1968.

APPENDIX B Traffic Control Devices

Appendix B constitutes a discussion of traffic control devices and techniques.

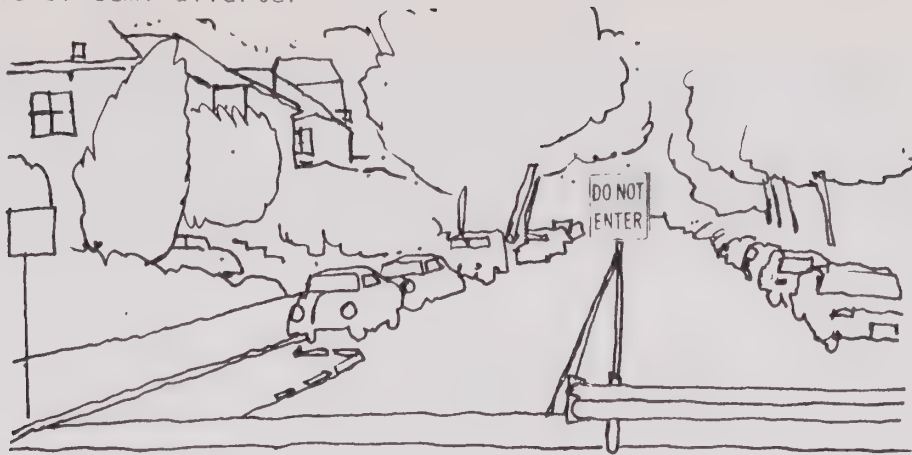
a. Traffic control devices to reduce speeding in neighborhoods (in order of effectiveness)

Traffic signals - a traffic signal is the ultimate traffic control device utilized to manage traffic and pedestrians at high demand, or extremely hazardous intersections. Although most effective for controlling traffic flow, and hence speed, their use (either in single time or coordinated installations) is best restricted to high volume intersections.

The ordinary traffic signal regulates traffic flow by displaying a sequence of green, yellow, and red indications to traffic on any given approach. In coordinated installations, as in the case of San Bruno, signals are interconnected with others nearby. Where levels of service are concerned, delays to traffic become important. Problems of left-turning vehicles should be considered with respect to specific conditions occurring at the particular intersection under study. Treatments such as separate left-turn signal phases may be effective if the number of left-turn movements is high. Leading or lagging green intervals, to allow some turns to clear free of opposing traffic, may be desirable. Channelized left-turn lanes separate left-turning traffic and allow through lanes to move to better advantage, regardless of whether or not the location is signalized.

Semi-diverter - a semi-diverter is a physical barrier which allows travel in one direction while prohibiting travel in the other direction. The barrier is most often placed close to an intersection to prohibit vehicles entering the street. Occasionally, special circumstances will dictate that a semi-diverter can consist of a barrier blocking one-half of the street or on very narrow streets. DO NOT ENTER signs can be placed on both sides of the street without placing an extensive barrier. Semi-diverters stop one direction of flow while allowing two-way travel on either side. They are particularly effective to control highly directional traffic although the relief provided by prohibiting even one direction of a balanced flow can be significant. Semi-diverters do not interrupt emergency services since those vehicles can turn on a siren and drive in the wrong direction if they must reach their destination. School buses can drive in the right direction but are not allowed to drive on the wrong side of the street to bypass a semi-diverter. Other services can also revise their routing to avoid being blocked by semi-diverters.

Example of Semi-diverter



Diverter - a diverter is a form of traffic barrier most typically employed to impose a curvilinear street pattern on a rectangular street grid. Diverters are typically deployed diagonally across an intersection to prevent straight through and either a right or left-turning movement. The remaining turning movement becomes the continuous flow movement.

Numerous designs for diverters are conceivable. These range from fully landscaped, permanent street reconstruction to extremely simple installations comprised of raised traffic bars. Beyond basic location, the key issues of design are aesthetics, whether the diverter would be passable for service and emergency vehicles, and if so, whether other vehicles would be prevented from using the emergency vehicle access or merely discouraged from using it.

Because of the fairly high cost (\$10,000 or more on the average) of a permanent diverter, it is wise to implement as many diverter elements as possible using materials which are relatively inexpensive, which facilitate construction, and which are sufficiently attractive to be tolerated for several years. A long term program to upgrade individual installations to full landscaped diverters as funding becomes available and the desired permanence of the installation would insure best use of resources.

Traffic circles - this special treatment places a small traffic circle in the middle of an existing intersection to provide a device less restrictive than a diverter that would reduce the volume and speed of the traffic in the area. Circles have been placed in various neighborhoods in the Bay Area and while comparative data are not available, residents on the whole believe that the traffic circle is effective as a self-enforcing speed reducer, even though there appears to be little change in volume associated with the installations.

This type of device is most effective when parking is utilized on both sides of the street, thus helping to provide a physical barrier channelizing vehicles into the intersection and preventing corner cutting, or when the street is very narrow. Where parking is heavy and provides a physical barrier to narrow the approach, drivers tend to slow down at the intersection. Where parking is sparse, artificial narrowing or channelization must be used to create a physical narrowed approach. Drivers will then be more apt to slow

down when entering the intersection since they are physically restricted from flattening their angle of approach to avoid speed reduction. A problem with traffic circles is that they change the relationship between vehicles and bicycles which is especially critical when vehicles are forced close to the curb in order to turn around the circle. Conflicts with pedestrians also occur, especially when there are no protected sidewalks or pathways for pedestrians to use.

Speed limits - speed limit signs are posted to inform drivers of the legal limits along the street network, although most streets in San Bruno fall under 25 mph prima facie limits, and are not posted. All streets with limits differing from 25 mph (i.e., El Camino Real at 35 mph) are posted and some streets with prima facie limits, usually those with higher volume, do have 25 mph limits posted. School signs mandate a 25 mph limit when children are present. This applies regardless of posted speed limits.

Installation of speed limit signs does not assure compliance. It has long been an accepted fact that most drivers travel at the speed they perceive to be most prudent under the circumstances. This characteristic means that unrealistically low speed limits will not be obeyed unless strict and continuing enforcement is applied. Modern speed enforcement is most effective with radar, since it allows sampling of a larger number of vehicles in a short period of time. However, recent legislation has been enacted to limit use of radar enforcement to streets on which speed limits have been justified on the basis of an engineering and traffic survey conducted within five years prior to issuing violations. On all other streets, radar is not valid as an enforcement tool. Even when speed surveys are conducted, they often indicate that the 25 mph speed limit is too low. Consequently, rather than change speed limits, enforcement is conducted by the car following method which is more time consuming than radar techniques.

Speed bumps - speed bumps are frequently proposed by citizens as a method to reduce speed along neighborhood streets. There are two aspects of speed bumps especially worthy of consideration -- legality and effectiveness. The California Traffic Control Device Committee, an advisory body at the state level, has considered a variety of traffic control devices, including speed bumps. The Committee recommended that speed bumps should not be an approved traffic control device for use on public thoroughfares. Consequently, the California Department of Transportation does not include speed bumps with other approved traffic control devices described in the Division's Traffic Manual. Furthermore, the California Vehicle Code (Section 21401) specifies: "Only those traffic control devices that conform to the uniform standards and specifications promulgated by the Department of Public Works shall be placed upon a street or highway." Certain other Code sections, such as 21465, which provides that no person shall place or maintain any unofficial sign, signal device, or marking and Section 21467 provides that every prohibited device is a public nuisance and authorizes removal of the same. Consequently, at the present time, speed bumps are illegal on public streets in California under these provisions.

With respect to effectiveness, experience in various California cities indicates that school buses had difficulties with the bumpy ride, fire departments found that the bumps caused equipment to become dislodged and fall from the fire truck into the street, teenage drivers loved to speed and race back and forth over the bumps for thrills.

Other communities reported occasional accidents related to speed bumps on private property with vehicles or bicycles going out of control. Thus, it should be concluded that an effective and safe speed bump which would be accepted legally for use as a specialized control device along neighborhood streets has not yet been designed.

Do not enter sign - This regulatory sign is placed to inform motorists that entrance to the roadway is prohibited. The sign is typically utilized at exists of one-way roads or ramps. A supplementary WRONG WAY sign is often used to give further explanation to approaching drivers. DO NOT ENTER signs are also placed to restrict travel through street closures left open to permit emergency vehicle access and at semi-diverters facing the closed direction of travel. Preliminary experience with DO NOT ENTER signs indicates reasonable effectiveness with regard to prohibiting entrance into the neighborhood from the major street; however, there is confusion when drivers arrive at the closure from within the neighborhood even though NOT A THROUGH STREET signs are properly placed. Some drivers pause and then turn around, while a significant number of drivers violate the sign and pass through the hole in the closure. While some confusion is to be expected when travel patterns are changed, it appears that enforcement would be required, at least initially, to reinforce the strict intent of the DO NOT ENTER sign used in connection with traffic diverters.

Stop signs - while installing a STOP sign is a relatively easy task, care must be taken to assure the location is appropriate, both from the standpoint of site characteristics and system relationships. Drivers must be able to see the sign well in advance. Even so, some drivers do not stop because they are preoccupied with their thoughts, or they are following their habitual driving patterns and pass through a location with a new sign. Other drivers are surprised at finding a STOP sign at a location where there is no apparent need. Obedience to STOP signs varies somewhat depending upon the circumstances, but typically includes a range of actions varying from drivers who come to a complete stop to drivers not stopping at all. STOP signs are not, then, an effective method to control speeding in neighborhoods.

b. Traffic control devices to reduce pedestrian-vehicular conflicts (in order of effectiveness)

Traffic and pedestrian signals - One often expressed concern relates to the pedestrian signals that can accompany traffic signal installation. WALK and DON'T WALK indications are confusing to many persons who complain that not enough WALK time is given to allow them to cross the street. While some minor adjustments can be made to ease the psychological effect, most of the problem is in lack of understanding of what pedestrian signal indications really mean. More education is needed, at all age levels, and through

various communications media, to assure fuller understanding of existing pedestrian cross procedures. The future may hold some changes in pedestrian signalization, such as adaptation of programmed visibility heads that would allow persons crossing during the WALK interval to see the WALK indication all the way across the street, while a DON'T WALK indication will face persons arriving at the intersection after the normal WALK interval has expired.

Chokers - choker is the name given to the practice of physically narrowing the street. Sight distance is improved by restricting parking. The sidewalk area at an intersection is increased when the width of intersection approaches is reduced. Pedestrian crossings are enhanced by creating an extended vantage point from which pedestrians view traffic while selecting a location for traffic signs closer to the drivers' normal line of sight and where obstruction is less likely to occur. Chokers can be installed at all approaches or can narrow only one approach or direction of travel to produce the desired effect. Concern is often voiced by bicyclists, who consider chokers as a barrier inhibiting their freedom of movement at the intersection and may even force the cyclist toward traffic bars in the street as hazards. The effect that chokers have on vehicle speed has not been documented, although it is believed the narrowing will tend to reduce speed and that a series of chokers will provide some speed reduction along a route. While temporary chokers are useful, permanent designs should be installed when the temporary installation has proven successful. A permanent design will consider revisions for bicycle travel and landscaping.

Stop sign - this control commands vehicles to stop, typically to reduce conflicts between crossing vehicles or with pedestrians. It may be used to assign one street priority right-of-way over another, to assign sequential right-of-way at intersections of streets of equal priority, or to protect intersections having restricted sight clearances. The problems of driver attitudes and habits when confronted with STOP signs was documented in the previous section on speeding in neighborhoods.

Residents often suggest that stop signs be used to divert traffic from neighborhoods so that people driving through will stay on major streets. Or, it is suggested that stop signs be used to control speeding. Neither of these purposes are well served by placement of stop signs, as drivers will continue to weave their way through a neighborhood if the major roads are congested, and it has been found that drivers slow down only between closely spaced intersections. Thus, stop signs should be used only when specific control of the ROW is desired--commanding vehicles to stop to reduce conflicts between crossing vehicles or with pedestrians.

Crosswalks - At intersections, crosswalks can be marked or unmarked. In either case, drivers must yield the right-of-way to a pedestrian crossing in the roadway. The fact that pedestrians have the right-of-way in that situation does not relieve them of exercising due caution for their own safety.

There is substantial controversy regarding painting or not painting crosswalks. Some persons believe that "if you paint a crosswalk, the motorist can more easily see it and therefore take special precautions to avoid hitting pedestrians." Other persons say, "if you paint a crosswalk you are encouraging the pedestrian to place himself in a hazardous position under the mistaken belief that the motorist will, in all cases, stop." While both schools of **thought** are concerned with pedestrian safety, which practice is safer? The City of San Diego conducted a study with the purpose of obtaining factual data regarding the relative number of accidents that occur in painted crosswalks and unpainted crosswalks. Observations were made over a five-year period at 400 intersections and pedestrian volumes were taken at some of the intersections to provide some measure of pedestrian usage. The results of the study indicate that "the number of accidents happening in painted crosswalks exceeds those in unpainted crosswalks by an amount greater than would be expected in terms of usage." While the findings in San Diego may not have universal application, they appear to point to a need for careful consideration before striping a crosswalk.

c. Other relevant traffic control devices and techniques

KEEP RIGHT	This regulatory sign is placed where traffic in the opposite direction is separated by a median island, traffic circle, pier of a structure or other obstruction. KEEP RIGHT signs provide clear instruction to drivers approaching and are used to avoid head-on conflicts as well as clarifying lane usage for drivers approaching the through direction of travel at a semi-diverter.
ONE-WAY	This regulatory sign is used to inform motorist of one-way streets and roadways. Signs are placed at intersecting streets as well as major driveways to be clearly visible by drivers in a position to make a wrong turn.
STOP AHEAD	These warning signs are placed on the approaches to STOP intersections where visibility is restricted, or where high approach speeds require advance warning and at unexpected STOP sign locations. Where there are severe sight distance problems, electrical flashers can be installed for emphasis. STOP AHEAD signs are also useful as temporary devices providing supplemental warning to drivers at new STOP sign installations.
PEDESTRIAN AND SCHOOL CROSSING SIGNS	These warning signs are placed prior to crosswalks to alert drivers that they are in close proximity to a crosswalk. Pedestrian crossing signs are diamond shaped while school crossing signs are pentagonal. While many school crossings have advance crossing signs, most pedestrian crosswalks are unsigned. Pedestrian crossing signs are most helpful when a frequently used crosswalk cannot be seen by approaching drivers as well as midblock crossings where pedestrian activity is unexpected.

NOT A THROUGH STREET

This warning sign is used to indicate a dead end street or cul-de-sac. It is placed near the entrance to such a street to advise through traffic not to enter. These signs are particularly useful, especially if the closure is beyond the drivers' view. NOT A THROUGH STREET signs should be placed at all appropriate locations to warn of closures. It may take some drivers several trips past a new device in order to react to it. Closures are more dramatic and one time traveling by a NOT A THROUGH STREET sign will probably result in a great enough shock to drivers so they are likely to avoid making the same mistake twice. For those persons passing the signs who consciously violate the opening in the closure, enforcement is the only deterrent.

ARROWS

Warning arrow signs are used to alert drivers of important alignment changes. Common applications are seen prior to curves showing the direction of curvature and some times supplemented advisory speed limits. Arrow signs are also utilized at all diverters to inform approaching drivers of the direction of the mandatory turn. A reflectorized diamond shaped sign supplements the arrow sign to further warn approaching drivers of an obstruction ahead and the need to turn.

PARKING

There are a variety of regulatory and guide signs denoting parking locations, availability, vehicle type, duration, and penalties. Parking signs are placed to delineate special parking zones and usually require enforcement to regulate usage. Parking enforcement is viewed as unnecessary harassment by some residents, while others often believe that it should be increased. The fact is that poor parking practice and lack of proper parking enforcement will decrease street capacity as well as impact adjacent neighborhoods with parking traffic and through traffic seeking relief from arterial congestion. Strict enforcement of no parking loading zones and of double parking restrictions is essential as a minimum effort to increase through street efficiency.

DELINEATION

Centerline striping - This type of striping is used to separate opposing traffic flows and is generally not required on neighborhood streets because of low traffic volumes, except for special situations. Short sections of centerlines (50-100 feet long) are used to delineate the approaches at some neighborhood intersections where traffic operation and supply can be improved by intersection identification and lane separation. Centerline striping on neighborhood streets is also useful at diverter locations to guide approaching traffic around the curve; at traffic circles to assure proper direction of travel; and at semi-diverters to separate the open lane from the closed lane. By confining vehicles to a more restrictive lane area, centerline delineation often acts as a psychological speed reduction device. There are three types of centerlines. The single

yellow dashed line means that drivers can cross over and drive to the left of it to pass other vehicles; solid yellow line paralleled by a broken yellow line means that when the broken stripe is in the motorist's lane, they may drive to the left of it to pass another vehicle. Finally, two solid parallel yellow stripes specifies a two-way barrier line where no vehicle may drive to the left of it except for the purpose of making a left turn at an intersection, entering or leaving a driveway or making a U-turn under rules governing such movements. Raised pavement markers may be used to augment or to simulate painted lines. No passing or barrier lines are installed where vertical and horizontal sight distances are restricted so as to make it unsafe to pass at prevailing speeds. The no passing barrier line is an effective device with a high degree of driver conformance and in addition to safety benefit, the barrier line can also affect speed along the street since the car at the head of the line cannot be passed and following drivers must adjust their speeds accordingly.

Lane Lines - While lane lines are utilized on multilane streets to separate travel in the same direction. Lane lines are seldom used on neighborhood streets except where usage and geometrics dictate the need for lane separation, such as may be required to identify a turning lane at an intersection. Turning lanes are more commonly striped on through streets where they are used to increase efficiency and safety at busy intersections by separating turning vehicles from through traffic.

Bicycle Lanes - Bicycle lanes are striped along streets to provide an area for bicycle travel which is separated from the vehicular travel lanes. Some streets are wide enough to accommodate bicycle lanes as well as travel lanes and parking, while on narrower streets some or all of the parking must be removed if bike lanes are striped. Typically, bike lane striping is most needed where there is moderate to heavy vehicular traffic and is not usually necessary along low volume streets.

Stop Bars - Stop bars or limit lines may be used at intersections to delineate the suggested stopping point. Stop bars are particularly helpful at skewed intersections or at locations where vehicles have a tendency to stop beyond the curb line or interfere with pedestrian crossings.

Stop Ahead - This pavement marking is used to supplement the STOP AHEAD warning sign prior to a stop intersection where there is need to provide extra warning to approaching drivers, such as for a STOP sign located around a curve out of sight of the drivers' view.

This report was prepared by
Torrey & Torrey Inc.
Planning
Urban Design
Community Participation

John Torrey, Vice-President
Irene Torrey, President

Acknowledgements

Many thanks are due to Mr. Paul Moeller, Planning Director, Ms. Kay Ransom, Assistant Planner, Mr. Jim Evans, Planning Aide, and to Mr. Leo Van Dusen, Public Works Director, for their help in preparation of this report.

Persons Consulted in Preparation of this Element

Mr. William Nelson, California Department of Planning and Research
Mr. Ted McHugh, Bay Area Pollution Control District
Mr. William Rozar, San Mateo County Planning Department
Mr. Martin Boat, San Mateo County Planning Department
Mr. Paul Moeller, Director, San Bruno Planning Department
Ms. Kay Ransom, San Bruno Planning Department
Mr. Leo Van Dusen, Director, San Bruno Public Works Department
Lt. Hugh Fraser, Traffic Safety Officer, San Bruno Police Department
Mr. Paul Hensley, California Department of Transportation, District 04
Mr. Mike Ellis, California Department of Transportation, District 04
Mr. Hanna Kolo, Metropolitan Transportation Commission
Mr. Alva Johnson, Metropolitan Transportation Commission
Mr. John Guilhamet, San Mateo County Planning Department

INSTITUTE OF GOVERNMENT
STUDIES LIBRARY
SEP 20 1972
UNIVERSITY OF CALIFORNIA

79 00698

U.C. BERKELEY LIBRARIES



C123310644

INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

SEP 30 2024

UNIVERSITY OF CALIFORNIA

